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April 1988

CAR ACTION



**R/C FERRARI
FEVER!**

RC-10 vs. ULTIMA

**HAS THE RC-10 SEEN
BETTER DAYS?**



NEW! CLOD BUSTER

CRUSHER



**TORTURE
TEST!**

**Did the Hornet
Survive?**

**Soldering
Basics**

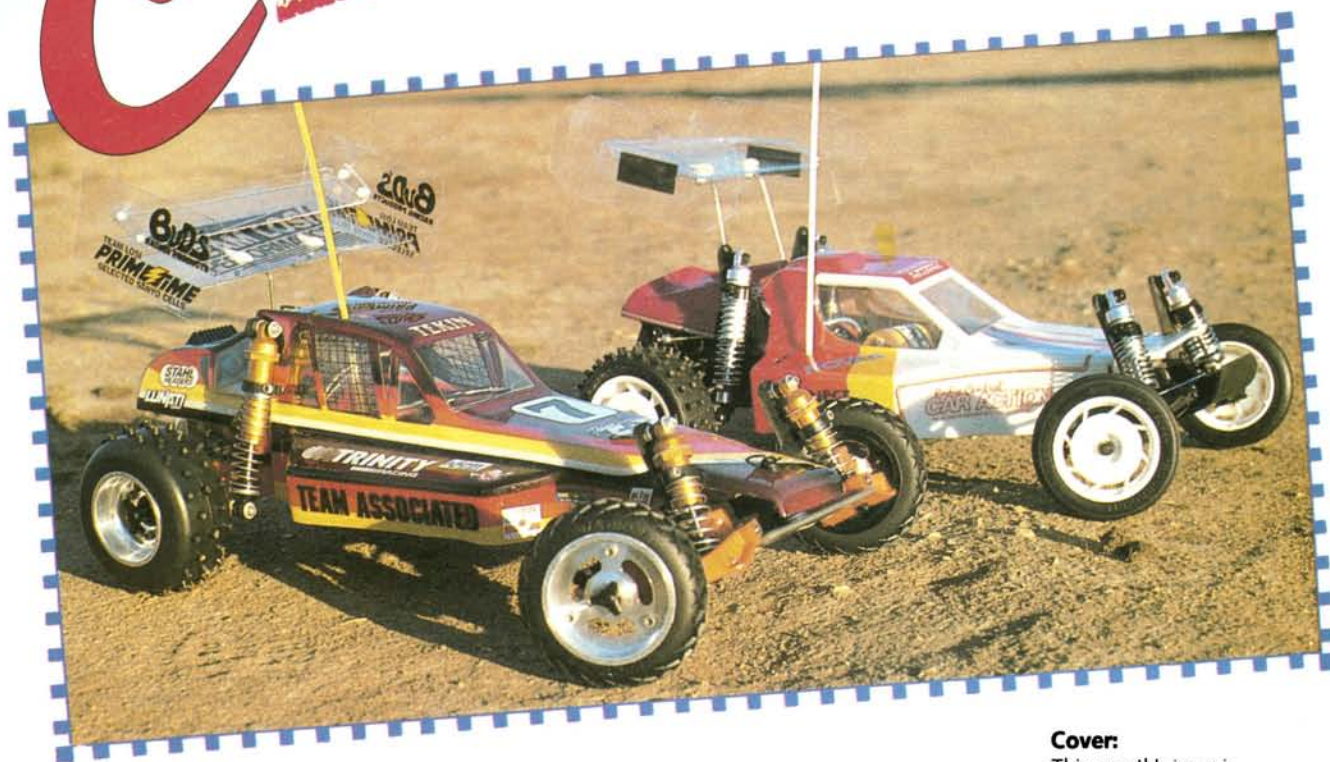
**Montero
Burner!**



Ferrari

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April 1988



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Cover:

This month's issue is spearheaded, as illustrated, by Ferrari Fever. The Ferrari, in its red regalia, is a 1987 Testarossa photographed from a Highway Patrol chopper. At top center is Robbe's 1/10-ultra-scale version of the "Redhead." Busting its way through this month's cover collage of R/C nirvana is the new twin-motor Tamiya Clod Buster. At bottom left Kyosho's nitro-burning Montero is at home basking in the Baja.

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EDITORIAL

by LOUIS V. DeFRANCESCO JR.

FERRARI. IT'S COMMON KNOWLEDGE that any automobile produced over the last four decades that bears the symbolic black prancing horse has always immediately gotten public attention and become legend in automotive circles. It's no wonder that some of the R/C manufacturers are producing Ferraris in various scales. Enter our special Ferrari issue or, more specifically, our Testarossa issue. We have the latest "redheads" for you and some insight into the full-scale version. We know you'll enjoy them!



Publisher Louis DeFrancesco pictured with his 1987 Testarossa, the new 1/10-scale Robbe and 1/24-scale Tamtech R/C versions in hand.

When planning issues, we always try to include articles that can really help the modeler in building and repairing his R/C car. Associate editor Steve Pond noticed that many modelers have difficulty in making a good solder connection. Bad solder connections can be the catalyst to many electrical problems, so you might want to check out his article.

We've been getting hundreds of letters requesting car comparisons so, responding to the demands of you readers, we decided to start going head-to-head with some of your favorite cars, and we're kicking it off with the RC 10 vs. Ultima shoot-out. Find out if the Ultima retained its crown in our testing!

The new 1/24-scale cars are gaining in popularity so, in keeping with our Ferrari theme, we put the Tamtech Testarossa up against the new ABC version, and you'll be surprised at the results.

When perusing tracks throughout the country, we always make a point of checking out what the modelers are running. What's most striking is the wear and tear on the car and the abuse which most R/C cars are subjected to. What happens when you take a three-year-old car and really give it a thrashing? Find out in our "Torture Test" article; you'll be amazed.

There's plenty more, and a lot you can really sink your R/C incisors into in this issue; and don't forget that trouble's brewin' next issue with our monster truck shoot-out!

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Letters

Ayatollah ain't all there. But as for your monster-truck shoot-out, you can be assured it's close by; maybe in the next issue! Thanks for nothing.

In reference to Todd's questions: Yes, you can use an 8.4V-pack with your 540, and the Blackfoot review was in the February '87 issue. Sorry, Todd, your monster-mad "associates" almost made me forget to answer. CC

Where's The Hot Dog?

Right on guys and gals! Your mag is super. Keep up the good work. I also picked up your 1988 Buyers' Guide—Great item; it's helped me already.

Last winter I bought a Monogram 1/10-scale model, "Mad Wolf." What a car! I've been looking for an article on Mad Wolf for over a year now, hoping especially for hop-up hints. I've really been impressed with its ability to run circles around most cars, including the famous RC 10.

Sure would appreciate your checking one out and maybe writing an article on it.

LARRY McCAIN
Grand Junction, CO

Larry, unfortunately, the Mad Wolf is being phased out owing to supply problems. If you're sold on Monogram cars, their 4WD Tornado has many good features and a lot of potential with stiffer springs and oil-shocks. (See April '87 issue of RCCA.) Sorry about the Mad Wolf. CC

And The Light Goes Out

I'm a 13-year-old R/C car maniac, and I recently purchased the RC 10. I have a question on one of the Pit Tips in your February '88 issue. It says to solder a 12V bulb to a connector and hook it onto the Ni-Cd. By using this discharging method you know when the battery is flat because the bulb goes out. Will this damage the cells by draining them too much?

TROY DAVISON
Northridge, CA

Troy, the reason for using a 12V bulb is that on a 7.2 pack it will stop glowing (at around 2V or 3V) before the pack is completely discharged. I've never tried this method of discharging but, like any other method, a Ni-Cd shouldn't be overly discharged. I recommend that the bulb be disconnected when it stops glowing or very shortly after. CC

Running Time

Two months is too long for me to wait for your magazine. There is no comparison between your magazine and the other leading car magazines.

I have a Tamiya Boomerang with ball bearings. I want to know if a Kyosho 240SB motor will last through a three-minute race, or should I get a 360 Gold motor which will definitely last? I'm using a 7-cell Sanyo pack and I race on an oval dirt track. There's loose sand at the two ends, but it slows the cars down. Thank you.

TONY BENSON
Pasadena, MD

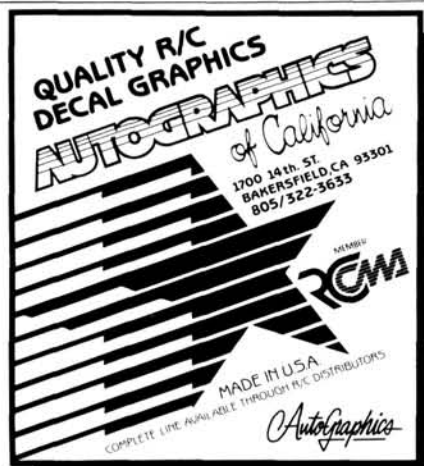
Tony, with the stock gearing you might get three minutes (but probably not four) using the hot 240SB. Gearing, among other things (like drive train drag), will affect your running time. Generally speaking, the larger the pinion, the higher the top speed and the shorter the running time. Conversely, a smaller pinion will give you longer running time, but the top speed will be affected—but top speed is far from being everything. You could go to a 360G, but keep in mind that it's not R.O.A.R. legal, being a 550-size car. Certain clubs using R.O.A.R. guidelines won't allow its use in their competitions.

Terrain is another factor. Let's say a car will go five minutes on asphalt. Take this same off-roader and put it on an off-road course, and this running time will be cut owing to the high drag encountered in the dirt, which makes a greater demand for battery power. CC

We welcome your comments, and suggestions. Letters should be addressed to "Letters," Radio Control Car Action, 632 Danbury Rd., Wilton, CT 06897. Letters may be edited for clarity and length. We regret that due to the tremendous amount of letters we receive we cannot respond to every one.



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Letters



The Ayatollah Approves!!

I'd like to see *R/C Car Action* do an all-out battle of R/C monster trucks like the MRC Clod Buster and the MRP High Roller. I'd like to hear your comments about them and which one you think is better. I have the MRC Blackfoot and was wondering if I can run an 8.4V battery without hurting my 540 motor.

I'm very impressed with your magazine. Do you have a back issue with a track report on the MRC Blackfoot? Keep up the super work.

TODD D. COE
Penfield, NY

Keep up the good work. You've got a great magazine going. I've read every issue at least a dozen times. I love the reviews and want to see more, especially reviews of monster trucks. The review of the Blackfoot was great; it convinced me to buy the Monster Beetle. How about a centerfold in each issue featuring a beautiful girl and one or all of the cars reviewed in the mag? Continuing to cruise.

SHANE HILSENDAGER
Saskatoon, Saskatchewan, Canada

I love your magazine as it's a great source of information. Drag racers and stock cars are fun, but I love monster trucks.

A test should be done where most monster truck enthusiasts run them—in the rough stuff!

A gnarly off-road course should be found. The course should have hill-climbs, rocks, sand, mud, jumps and smooth dirt for power slides and such.

Now this would be a test! Long live the wasteland!

Tell Garrett that I love his work. I've been learning airbrush for a while now, and most people don't realize the time it takes. The results speak for themselves.

Please don't put this in the letters section; people would think I'm insane!! Adios.

NAME AND ADDRESS
WITHHELD.

I'm 14 years old and I became interested in R/C cars about one year ago. I started reading your magazine and got hooked. For about the last couple of months, I've been going through the articles on the monster trucks and they really have my attention. I love the way you take the 2WD monsters and turn them into some pretty mean machines. How about just asking the Ayatollah of Radio Controlla if you can devote an entire edition of *RCCA* to the ever-growing selection of monster trucks?

MIKE O'GARA
Long Island, NY

ALL RIGHT! ALL RIGHT! ALL RIGHT! I can't stand anymore. There's nothing worse than whining monster-truck freaks. You guys are responsible if I end up in the booby hatch with mister "name and address withheld." (I'm already halfway there as it is!)

I trekked my way to the Pristine Palace of the Ayatollah of Radio Controlla on behalf of you monster-mashers. For three days and three nights I camped out in my faithful Trooper II in wind and snow, patiently awaiting an audience with the Ayatollah. Finally, on the morning of the fourth day, the Ayatollah appeared at the palace gates and, before I got a chance to say a word, he barked "You will all Rock and Rolla with your Monster Trucks"—as though it was his idea in the first place! And if that wasn't enough, he unloaded profanities in my general direction, because I had disturbed his rest with his wounded Testarossa, and then said he was having trouble getting that temperamental Ferrari back to sleep. Forget about temperamental; let's talk for a moment about mental, as in "case." The

Track Report

CLOD

Buster



MEET THE
HUMUNGOUS!



by STEVE POND

THE LEGEND OF THE car-crushing monster truck began years ago in an empty field with a couple of junk cars and Bob Chandler's lifted Ford F-250 pick-up. Although not as high or as high-tech as today's monsters, the Bigfoot of old began what is now one of the wildest spectator events. It was inconceivable that anyone could fit such large tires on these trucks and still manage to get them to move. As tires grew larger and vehicles rose higher, the fans were increasingly captivated.

This fascination with the R/C monster truck has followed in the footsteps of its full-scale look-alikes, as the race for altitude among R/C manufacturers has become heated. One of these, the Tamiya Plastic Model Co.*, is at the leading edge of monster technology with some of the most durable, versatile and innovative trucks ever to hit the market. Tamiya's new Clod Buster embodies all the most sought-after traits and also has the latest, most sensible features ever incorporated into a monster truck.

THE KIT: The 1/10-scale Clod Buster features both 4WD and 4WS. It has dual 540-type motors, front and rear suspension systems dampened by eight heavy-duty coil springs, front and rear sealed gearboxes with differentials, 165mm x 110mm terra-type monster tires, three-step forward-and-reverse speed control with BEC wiring and a highly detailed injection-molded body.

The 4WD and 4WS are not the only features that make this truck different from all the rest, but the way these are applied really caught my eye. Instead of using the usual shaft or chain drive, Tamiya simply uses two motors! In this

way, both the front and rear end are supplied with power without a friction-causing medium.

Another of Tamiya's more innovative ideas is the use of a power/economy switch between the dual motors. In the power position, the motors are connected in parallel. This means that both motors are connected with the correct polarity. In the economy position, the motors are connected in a series, and the positive lead of the first motor is connected to the negative lead of the second, with the remaining positive and negative wires completing the circuit. When the switch is in the "power" position, the running time is halved.

The 4WS isn't a new idea, but on other models it usually requires a 4-channel, 3-servo system. This isn't bad, but it meant buying another radio if all you had was a 2-channel. The Clod Buster design provides full-time 4WS, but allows you to use the same 2-channel system that would operate other R/C cars (with the exception of those equipped with mini-servos.)

CONSTRUCTION: Assembly of the Clod Buster doesn't require any special tools or a great deal of modeling experience; just time and patience. There are many parts, so I recommend that you build the Clod Buster on a big bench or table that won't have to be disturbed. You won't finish this one in a day!

The first step in construction is the installation of the radio equipment and the entire electrical system into the big chassis tub. The radio system is the incredible Futaba* Magnum. Although this radio is more suited to a race-type car, it's the hottest radio on the market. What better place for the hottest radio than in the hottest

Clod Buster

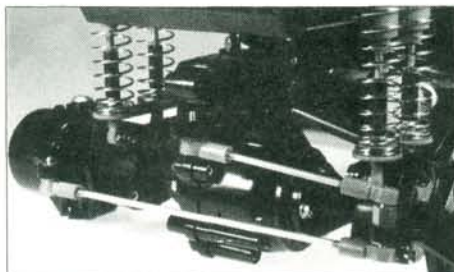


With two motors, the run time was shortened with a standard 1200mAh battery pack, but when using the Aerotrend 4000mAh battery pack, run time was more than triple!

new truck? The system features exponential throttle and steering, separate left and right steering end-point adjustments, brake trim, throttle-high trim, dual-rate steering, adjustable wheel tension, three-position trigger, brake point adjustment, servo reversing, a third auxiliary channel and a detachable Ni-Cd battery.

The system is available with FP-S132S high-speed mini servos, or with the Goliath of Futaba car servos, the FP-S131S. This servo is actually smaller than a standard servo, but it packs more than twice the punch with 45 ounce/inches of torque.

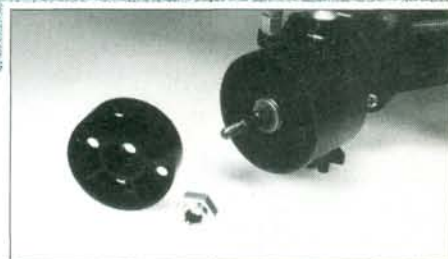
The one thing the Magnum lacks is a BEC (Battery Eliminator Circuit). Although it's not essential, using it



The steering system on both ends of the Clod Buster features adjustable servo-savers and heavy-duty torsion bars.

means you can buy four fewer batteries. I opted for a separate BEC switch, which is available from MRC/Tamiya for most popular radio systems.

Once the radio and electrical equipment are installed, the two differentials may be assembled. Steps 19 through 36 in the instruction manual must be followed once, and then repeated to produce the two identical assemblies. As a matter of



To connect the huge terra tires to the business end of the Clod Buster, brass wheel-nuts and large wheel-adapters are fastened to splined axles.

fact, if there wasn't a bumper on one end of the chassis, I'd never be able to tell the difference between the front and rear without the body on!

Included in the kit are the usual Tamiya plastic bearings used almost throughout the Clod Buster. These are a disappointment, because the tolerances soon open up and cause the hardware to get sloppy. This is one area on the Clod Buster that needs improvement. This criticism applies to all Tamiya kits. These kits have such a long-standing reputation for durability that it's hard to understand why they continue to use these plastic bearings. This problem is amplified on the Clod Buster, as wear is accelerated because of its size and weight.

(Continued on page 76)



The Inside Scoop

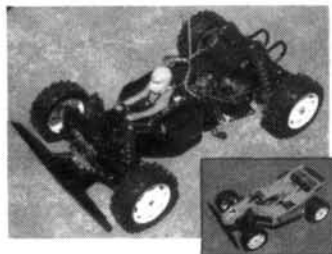
THE R/C CAR industry is rapidly advancing, with new products being offered at a head-spinning rate. So, I'll make manufacturers nervous, but feed you R/C squirrels who are hungry for info, by bringing you a special report on security leaks and "late-in" items. Here goes!

by CHRIS CHIANELLI



MUGEN MERCURY XI-4

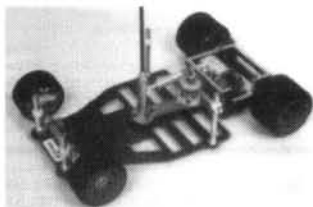
MID-MOTOR madness! Greetings, fellow R/C lizards! I'll start this month's Scoop with classified info received from "High Lingafoon," our code-named spy in the Orient. From the photos, it appears that manufacturers are holding out on us *again!* Although we can't be sure if it's chain- or belt-drive, this Mugen (mid-motor) Mercury XI-4 looks like a state-of-the-art 4WD



NIKKO RANDY DASH

off-roader. This one might be a wise choice for Varicom to import and I hope they will. But wait; there are still more surprises on this roll of micro-film. Nikko has a mid-motor belt-drive $\frac{1}{10}$ -scale off-roader? Yes; and as far as we know it's called the Randy Dash. Looking at the diagram of the Dash's insides, I think that further investigation is in order.

YOU DIDN'T HEAR this from us! A late leak-in! Don't quote us, but we've heard through the grapevine that one of the biggest names in R/C is working on a new radio which is scheduled to be released this spring. More on this next month.



ABC NEW $\frac{1}{12}$ -SCALE CHASSIS

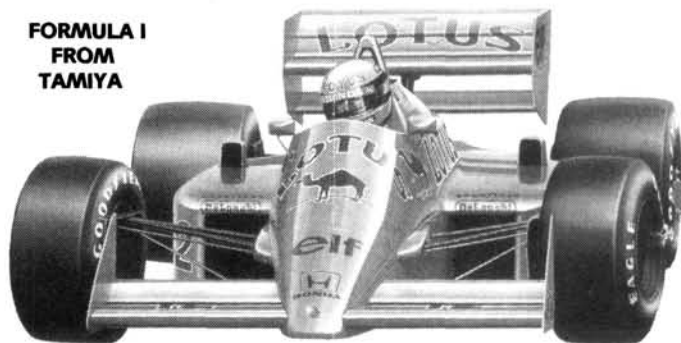
ABC HOLDING OUT? Here are two very interesting photos from ABC Hobbies. One appears to be of a $\frac{1}{12}$ -scale chassis looking much like the $\frac{1}{10}$ - and $\frac{1}{12}$ -scale hottest on-road cars that are being run in competitions and winning at the superspeedways. The



ABC $\frac{1}{20}$ -SCALE FORMULA I

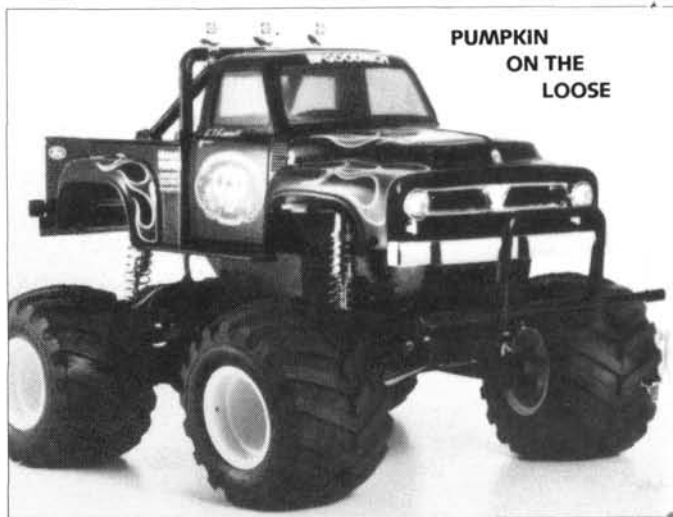
other photo is of a $\frac{1}{20}$ -scale Formula I car with Lexan body that appears to have a ball differential. If this car runs anything like the ABC $\frac{1}{24}$ -scale Testarossa, it will be in hot demand—if it's ever imported!

**FORMULA I
FROM
TAMIYA**



CLEAN MACHINES. For those of you who don't like doing it in the dirt, the recent growth in $\frac{1}{10}$ -scale on-road has been great news. Well, it looks like Formula I and other open-wheel Indy-type cars are ready to join the mainstream when Tamiya

adds two new Formula I cars to their line. The Lotus Honda 99T (pictured here) and the Williams FW-11B Honda both feature 3-point suspensions with a T-bar-type chassis. Watch for an up-coming review.



**PUMPKIN
ON THE
LOOSE**

AFTER MIDNIGHT, depending on whether you believe in fairy tales or rock music, most will either be turning into pumpkins or "letting it all hang down." But, if you really know what's happening and if your batteries have a really good charge on them, after

midnight, you'll be stomping with a monster truck like the new $\frac{1}{12}$ -scale Midnight Pumpkin from Tamiya. This great-looking '53 Ford pickup uses the same chassis as the Lunch Box. We'll see how it does in our monster truck shoot-out.



HOT SHOT EVOLUTION

PLEASE! GIVE ME another shot. OK; how about a Thunder Shot? Here's yet another stage in the evolution of the Hot Shot. All I can tell you is that this is the most competitive of the Shot series, and you can get at the radio easily—a welcome improvement.



MRC MYSTERY RADIO

Also, look, could this be a new generation of radios from MRC? Looks like an integrated receiver/electronic speed controller.

PARMA 1/10-SCALE on-road. Rumor has it that Parma International is introducing no fewer than five new 1/10-scale on-road cars! One new arrival is the Pro Panther 10, which showed nicely at Whippoorwill and is available with sports, hot rod or oval body. Another is the 1/10-scale Challenger Sprint Car designed for asphalt and dirt oval. And, for you drag rats, there's the 1/10-scale Pro Funny Car with an Oldsmobile Firenza body. Do you think they keep themselves busy at Parma?

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MRC's Striker & Challenge 250
(2 channel, dual stick)
Combo Value \$174.20
COMBO SPECIAL \$119.95



Tamiya's Frog & 302 PX Pistol Grip
(2 channel, wheel)
Combo Value \$240.65
COMBO SPECIAL \$172.95



Tamiya's Fox & 302PX Pistol Grip
(2 channel, wheel)
Combo Value \$269.95
COMBO SPECIAL \$189.95



Monster Beetle & Challenger 250
(dual stick, 2 channel)
Combo Value \$238.55
COMBO SPECIAL \$164.95



R/C CARS

	Retail	INDY
RA 5835 Wild Willy	168.75	\$114.75
RA 5843 Grasshopper	88.00	\$59.95
RA 5845 Hornet	118.40	\$81.00
RA 5848 Bruiser	394.60	\$268.95
RA 5850 Wild One	202.15	\$139.95
RA 5851 The Fox	194.30	\$132.00
RA 5842 Porsche 956	205.20	\$139.95
RA 5849 Toyota Toms	164.40	\$112.00
RA 5852 Newman Porsche	164.40	\$112.00
RA 5854 SuperShot	330.20	\$225.00
RA 5853 Road Wizard	146.29	\$99.95
RA 5855 Boomerang	192.70	\$131.00
RA 5456 The Falcon	140.55	\$96.00
RA 5857 BigWig	320.75	\$219.75
RC 5858 Blackfoot	125.00	\$86.00
RC 5859 Porsche 959	294.50	\$210.00
RA 5860 Monster Beetle	178.60	\$125.00
RB 5861 Striker	116.95	\$88.00
RA 5863 Lunchbox	116.95	\$81.85
RA 5862 HotShot	224.95	\$159.95
RA 5864 Toyota Celica Rally	299.95	\$203.95
RA 5865 NEW!! Clodbuster	305.00	\$208.95
RA 5866 NEW!! Super Sabre	202.95	\$139.95

O N R O A D

Race Strategy



At the start, decide how you're going to handle the first turn. And keep in mind the safest place to pass is usually on the inside of the turn.

Strive For A Consistent Braking Technique

by RICH HEMSTREET

WHICH DRIVING style is best? Late braking or early braking? Coasting through a turn, or accelerating through?

There's no simple answer.

What's important is that your driving style and your car's capabilities should be in sync. If you habitually brake late, that means heavy braking after you enter the turn, so your car must have good brakes. If you like to accelerate through the turns, your gearing and motor should be chosen with that in mind.

You may not know which driving techniques you use, as techniques may vary from lap to lap and from corner to corner. If that's the case, you're not getting the most out of your car. The next time you're out racing, pay attention to where you let off the throttle for each turn, and where you get back on. Try to achieve a consistent driving style. Once you're driving consistently, you can tune your car to maximize your performance.

I've always preferred to race a car with good brakes, as I have a late-braking driving style. I know other drivers who run with virtually no brakes, tending to coast into a turn with an early shut-off of

the throttle.

As I recently discovered, changing an established driving style takes a great deal of concentration and self-discipline. I decided to change to an early braking style, and found that it's not easy to both race and change driving habits. When I'm running alone on the track, I can remember to brake early but in traffic I automatically revert to late braking. Old habits are hard to break!

If there's one time in R/C races that's the most important, it's the first turn. The majority of races last eight minutes or less. This means that the car in the lead at the start of the race has a big advantage. By running on an open track, the lead driver can frequently open up a big gap between his car and the rest of the pack.

R/C races often have large wrecks in the first turns. These seemingly inevitable pile-ups necessitate several types of race-starting strategies. If you know you can out-accelerate the rest of the drivers on the green flag, then do so, but try to take the first turn very tightly on the inside to avoid being T-boned by some other car and so overshooting the corner.

If you can't beat everyone else to the first turn, it's usually best either to keep

one second behind the rest of the cars, which then charge off to the first-turn wrecking, or to use only $\frac{3}{4}$ throttle as you accelerate to the first turn. Either way, you should be able to pick your way between the cars and turn marshals, and have a clear track ahead of you. You'll gain the lead by avoiding the first-turn wreckage, even if you're the last one to the turn.

Once on your way, try to run a smooth, consistent line. The less your car is marshalled, the greater is your chance of winning. Most tracks give plenty of room for passing. Don't ever stay behind another car waiting for the driver to make a mistake so that you can duck inside of him on a turn. If the car in front of you takes too tight a line through the turns, pass him on the outside or on a straight. While you're waiting to pass a car, someone else is probably getting closer to the point where *they* can pass *you*!

Practice racing as often as you can. Don't give ground on the track; make other drivers *earn* a spot ahead of you. Keep at it and, eventually, you'll be first where it counts—at the finish line! ■

PROJECT

ULTIMA

by FRED MURPHY

THE SETTING WAS ROMSEY, England; the event was the IMFAR World Championships; the Kyosho* domination of the 2WD modified class was overwhelming. Joel Johnson of the United States crossed the finish line first; his car?—the Kyosho Ultima. Katsunori Kondo finished second, gaining honors for Japan; his car?—the Ultima. The next competitor to cross the line was Kris Moore of the United States; the car?—of course, the Kyosho Ultima! A clean sweep of the 2WD modified class for Kyosho means that the statement "The Next World Champion" no longer applies to the Ultima.

After Kyosho's strong showing at the World Championships, many said that we wouldn't be able to tell that the winning car was an Ultima. It was said that the Ultima had to be *extensively* modified to be a world-class winner. So, with the help of the Kyosho racing team, I bring you World Champion Project Ultima and a complete list of the components used on the first-, second- and third-place winners.

First, Kris Moore's third-place car. Kris used the special Ultima chassis, the special radio plate with the Kyosho long shock towers and four Option House* gold shocks. The differential used a Kyosho hard final pinion and a set of custom-made hardened gears. The tires were stock Ultima front tires on Associated rims and Option House low-profile tires and wheels on the rear. His car's body came from RC Performance*, and the speed control and receiver were from Novak*. The steering servo was an Airtronics* 557. The power plant was a Twister* No. 201 motor with a set of matched Sanyo batteries. All except the custom-made hardened gears are readily available. I think that the custom gears didn't make much difference to the car's performance, so Kris Moore's Ultima is almost a stock Ultima, right down to the chassis.

The second-place finisher from Japan, Katsunori Kondo,



Stock Ultima tires and wheels, front sway bar and Option House platinum shocks are on Project Ultima. Joel Johnson actually used the Kyosho gold shocks on his championship Ultima.

used Kyosho and Futaba components for his car. He used all the Ultima Option House accessories, including the Option House 240WS motor, universal swing shafts, special rod set and the Kyosho bearing set. His receiver, servo without reverse and speed control were from Futaba. I'm not sure of the speed control model number, but I think it was the MC109. You and I could build this winner too!

The winning Ultima was put together by Joel Johnson, and his car is the basis for Project Ultima. Project Ultima begins with a Trinity chassis plate for the Ultima and a set of Trinity long shock towers. The stock A-arms and front end com-

A

**CUSTOM
BUILD
YOUR
OWN
WORLD
CHAMP!**

Above right: Option House adjustable rod sets are the major additions to the Ultima's rear suspension.



Below right: Novak's receiver, Tekin's speed control, Futaba's servo and Trinity's motor were all winners at the World Championships. Note stock steering assembly.
Below left: Chassis and shock towers (also shown above left in stalled) are from Trinity. Long shock towers provide extra suspension travel.

ponents are mounted onto these. Replace the stock rod set with the Option House special rod set, which is more easily adjusted than the stock set up. By the way, Project Ultima uses the stock steering servo saver assembly as did Joel Johnson's championship car. All four shocks are Kyosho gold shocks from Option House, and in the rear the stock dog bones are replaced with a set of Option House universal swing shafts. The differential is a stock box with added ball bearings from Kyosho. These ball bearings were added to front wheels and rear hubs as well.

Even though Project Ultima uses a stock gear box, Joel used a set of custom-made hardened gears which are not yet commercially available. However, I'm sure they'll soon be available from some enterprising manufacturer. The tire setup

(Continued on page 92)

Pit Tips

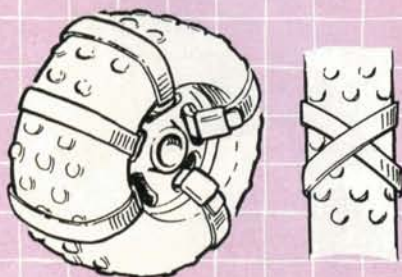
by JIM NEWMAN



STRONGER WING MOUNT

In this case, the wing mount is carried on an extension of the body, and it tended to flap until it cracked off. The car owner found that by filling the stiffening ribs with silicone tub sealer and gluing a block of foam to the top of the gear case (where it would support the body extension and prevent the flapping), he solved his problem with the wing.

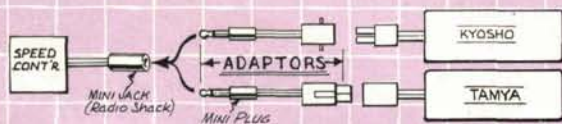
Ivan Herring, Alexandria, VA



WORN-OUT KNOBBIES

In order to restore some traction for just messing about, this car owner obtained some electrical wire tie-wraps and passed them around the tires and through the holes in the wheels, with the buckle located within the rim. He now gets good forward traction, but the car does tend to slide sideways in fast cornering. Perhaps it might help to put the tie-wraps on in pairs and crossed as shown.

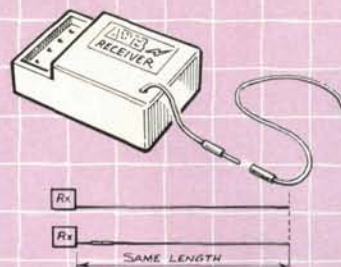
Garry Franklin, Marine City, MI



BATTERY PACK ADAPTORS

Two different cars and three battery packs! By cutting the lead at the speed controller and fitting the male part of a Radio Shack mini plug, our two friends can now interchange two different brands of battery by inserting simple adaptors to accommodate Kyosho or Tamiya plugs.

Robert Meisenger II, American Embassy, APO, NY



DETACHABLE ANTENNA

Our contributor has two cars and only one receiver, so he swaps it from car to car. To avoid wear and tear on the antenna wire by constant wrapping and unwrapping, he has cut the wire and soldered in a small plug and socket, so that each car now has its own antenna permanently installed and is merely plugged in to the receiver. Be sure that the antenna stays at its original length before cutting, or you'll have the receiver off tune.

David Astin, Phoenix City, AL



LOOSE WING MOUNT

Here's a situation where the wing mounting wires were a really sloppy fit in the mounting tubes. The car owner obtained a length of brass tube, which he soldered over the wires to form a sleeve and take up the excess space. Your columnist suggests an alternative: Put a couple of slight curves in the wires, which will then spring nicely into the mounting tubes.

George Stray, Tacoma, WA



PARTS CADDY

We have a busy lad who builds cars for others and, to keep all the parts to hand and in sequence, he empties all the parts bags into egg cartons. He then tapes the labels from the bags into the lid in logical order. The result is that everything is handy and well organized.

John E. Hsu, Greeley, CO

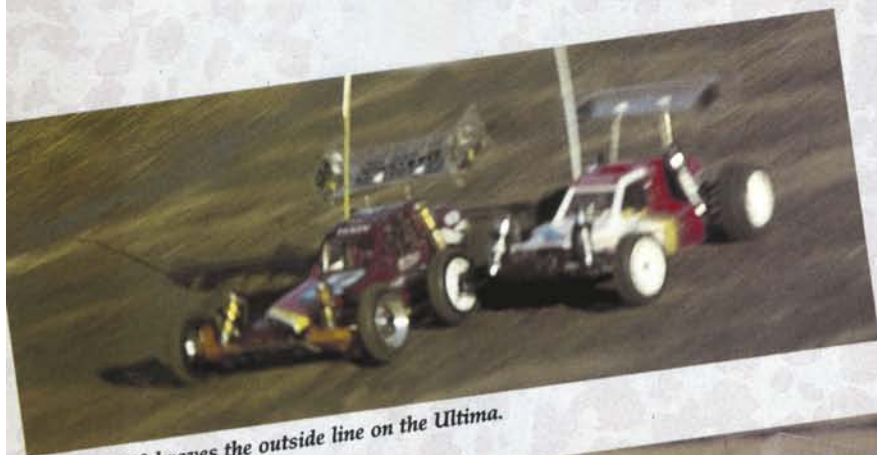
Radio Control Car Action will give a free one-year subscription (or one-year renewal if you already subscribe) for each idea used in "Pit Tips." Send rough sketch to Jim Newman, c/o Radio Control Car Action, 632 Danbury Rd., Wilton, CT 06897. BE SURE YOUR NAME AND ADDRESS ARE CLEARLY PRINTED ON EACH SKETCH, PHOTO, AND NOTE YOU SUBMIT. Because of the number of ideas we receive, we cannot acknowledge each one, nor can we return unused material.

RC 10 VS. ULTIMA

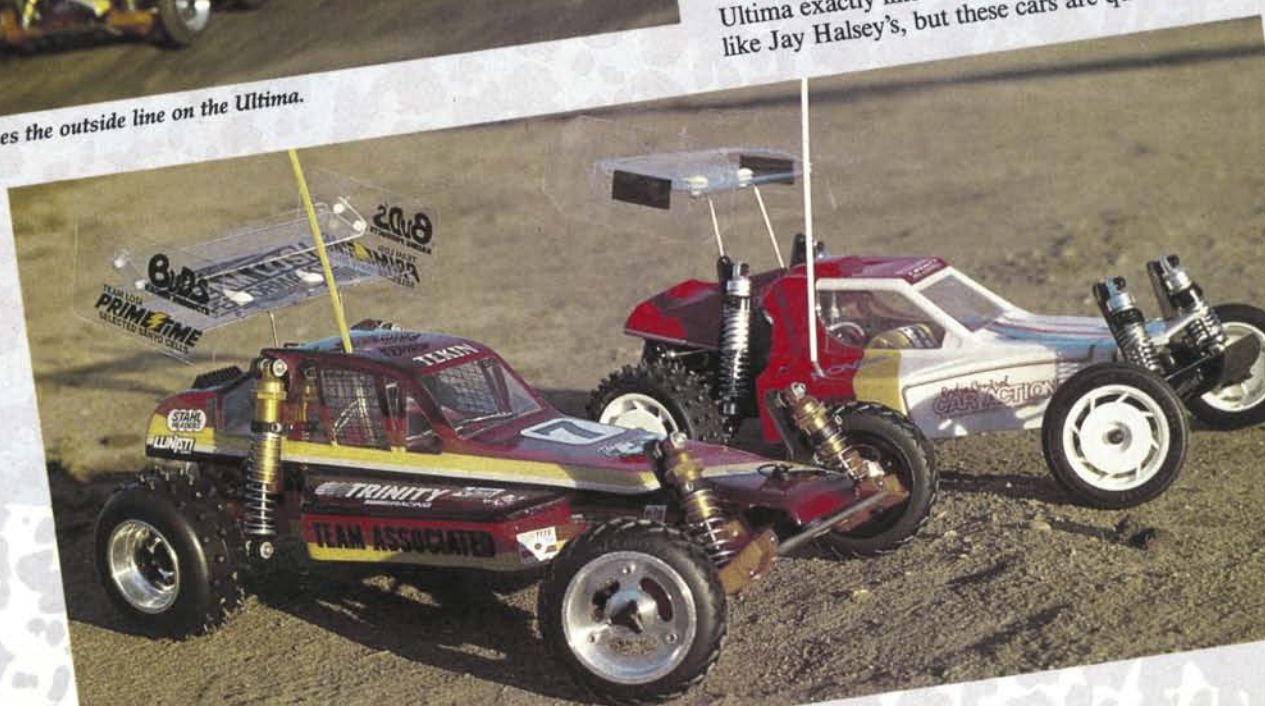
by RCCA STAFF

EVER SINCE JOEL "Magic" Johnson won the Off-Road Championships in England driving a Kyosho* Ultima, we've been receiving letters from R/C enthusiasts asking "Which is the better car; the Ultima or the previous champion, the RC 10?" We decided on a "Shoot-out" between a Kyosho Ultima in World Championship drag and a Modified RC 10.

Both cars are super modified, just as they would be in the World Championship race. Many people have gone to their hobby shops hoping to buy an Ultima exactly like Joel Johnson's or an RC 10 like Jay Halsey's, but these cars are quite different



The RC 10 braves the outside line on the Ultima.



The 2WD Top Contenders Meet Head-on



shoot-out squirrels, Fred Murphy and Steve Pond, are neatly framed here by the test cars. Drivers switched cars to equalize test conditions.

From a box stock car. Do you watch Bill Elliot win a Grand National race in a Thunderbird and expect to see the same car in dealership windows? Of course not!

Our two cars were the RC 10 from the "Project RC 10" article featured in the last issue of *Radio Control Car Action* and the Ultima from this issue's "Project Ultima." To even things up, both cars used the Revtech* "Yokomo Scorchers" modified motor and a Tekin* ESC 190 electronic speed control.

The testing took place at a track in Fairfield, CT, where we put both cars through their paces to decide the winner. Steve

Pond and the "Irishman" Fred Murphy (both of *Radio Control Car Action*), piloted the two missiles for the shoot-out.

First, both cars were run around the track and geared to run the four-minute heats as fast as they could without dumping their batteries. Steve and Fred then selected appropriate tires and made suspension and wing adjustments to get the quickest lap times. After this, the batteries were discharged (14 packs in all) and allowed to cool before they were charged for the showdown.

At the start of the test the ground was still hard, because the early-morning sun had not yet defrosted the surface. Both cars were adjusted to handle this terrain as well as possible, but the RC 10 with its ball differential scored two back-to-back victories against the Ultima with 5.29- and 3.41-second margins. As the ground started to thaw, the traction became a little better and the Ultima was able to claim the third heat with a 2.87-second margin. The fourth heat also went to the Ultima by a narrow margin of .73 seconds.

By then it was obvious that these cars were game combatants and that neither was about to give up. The RC 10 came back to

(Continued on page 95)



The RC 10 featured a Trinity composite chassis, Revtech motor, Tekin electronic speed control, Team Losi 7-cell Primetime battery pack and a host of other top-notch accessories.



The Ultima featured the same Revtech motor, Trinity composite chassis and battery, Tekin electronic speed control and Novak receiver, as well as a number of other accessories.

GIVING THE RACO GN BRAKES MUSCLE

QUARTER SCALE BRAKE JOB

by RICH HEMSTREET

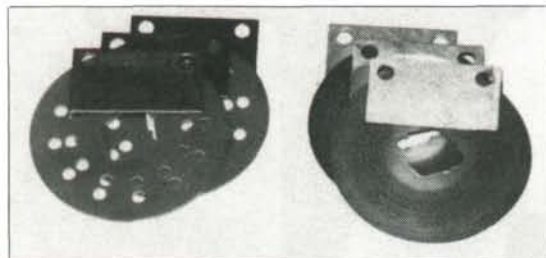
RACO* GN STOCK cars are built for oval-track pavement racing. According to the rules, these 1/4-scale cars must weigh at least 30 pounds, and that's a lot of weight to stop.

Here's a way to improve your GN's braking power. Using Hot Trick* accessories, you can both increase the braking power and provide for adjustment of that power. You can either set up the brakes so that they work quickly, or so that they come on slowly and only lock up at full servo movement.

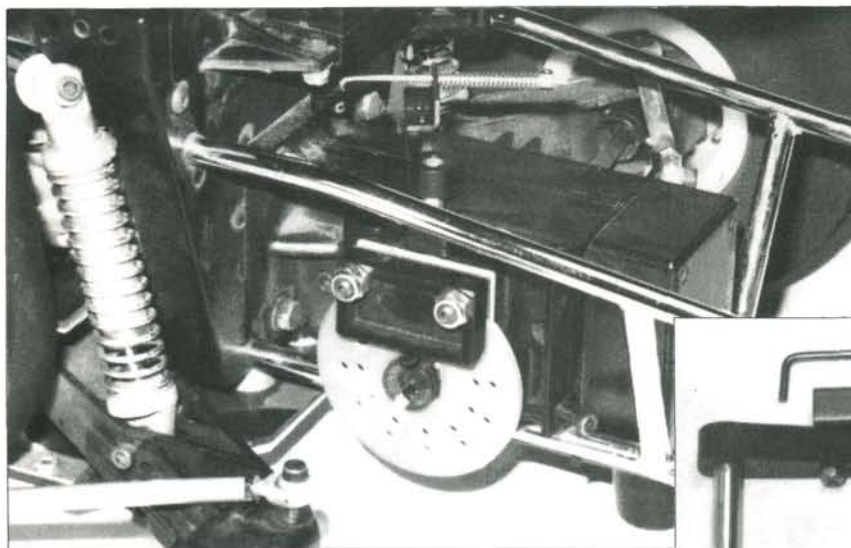
The three parts you need are the No. 402R TriDirComp S.S. brake kit, No. 414R brake extender and the No. 425R brake cam bracket.

You have to remove the half-shaft on the left side to install the S.S. brake kit. The standard fiber glass discs and thick steel pads are replaced with the red, ventilated, TriDirComp discs and thin steel pads. I used a standard, thick steel pad (rather than a thin one) up against the brake cam. This prevents the first disc from scraping against the roll cage on the bottom. Two thin pads were then used; one between the discs and one on the outside of the second disc. Now reinstall the half-shaft.

The brake cam bracket screws into the side of the gearbox, directly above the first steel plate. The self-tapping screws go in with firm pressure applied to the screwdriver. Don't drill the holes first, or you'll leave plastic shavings in the gearbox. This



Hot Trick discs and pads (left) replace the standard discs and pads.



Hot Trick brake parts are installed on the RACO GN. The difference was night and day and gave the 30-pound car the brakes it deserves.



The spring and wire provide the adjustability of the extender kit.

bracket helps to keep the cam upright, so that it won't cause drag when the brake is disengaged.

The brake extender bolts onto the arm of the brake cam. You must bend the end of the wire to go through the servo arm. This replaces the standard servo-to-cam connector. I think that the wire is about 1/2 inch too short. A longer wire could be used to provide more adjustment. It would

also attach to the last hole in the servo arm, thereby giving you the greatest range of trigger movement for full braking action. Be careful when you put the end of the wire through the servo arm. If it protrudes too far, it might stop the servo movement too soon, and there would then be little or no braking action. By adjusting the tension on the spring, you can vary the brake response.

Of these three accessories, the brake extender is probably the most important one, as it gives you the ability to adjust your braking action. When you put all these modifications together, you'll see much better braking with shorter stopping distances. Better brakes will keep your RACO GN out of many accidents. They will also shorten your pit stops as you bring your racer in for fuel on those long mains.

Be sure to check your brakes every time you fire up your car for a run. Quarter-scale cars should never be run with inadequate brakes. With Hot Trick brakes, your RACO GN is all set to stay out of trouble.

**The following are the companies mentioned in this article:*

RACO Model Craft, 1400 E. Saint Andrew's Place, Santa Ana, CA 92705.

Hot Trick Racing Cars, Inc., 1157 Cushman Ave., San Diego, CA 92110.

TORTURE TEST



A HORNET WITH
ONLY ONE WING??
...TOO BAD!!
bye, bye !!



by RICH URAVITCH

IN THE SUMMER 1986 ISSUE of *RCCA* I presented a Track Report on the then relatively new MRC/Tamiya Hornet off-roader. I was impressed and pointed out what appeared to be the strengths and weaknesses of the car. One of the things that I mentioned was the importance of "good, entry-level, high-quality cars that are well designed and nearly bulletproof."

Over two years have passed since I originally ran the Hornet and it has, beyond any doubt, met those





WE PUT A 3-YEAR-OLD TAMIYA HORNET THROUGH A GRUELING DESTRUCTO SESSION

requirements. It has survived some incredibly hard driving, some serious competition and some awesome encounters with lesser vehicles. It is unquestionably my wife, Maribet's, favorite ride so, when the time for this torture test arrived, she viewed the whole exercise with mixed emotions. Sure, she'd get to bash it around even more seriously than she normally does, but she'd have help. After all, it is her favorite car.

When she discovered that I'd enlisted the services of "Dr. Go" Rilla to assist in the test, she began anticipating the rapid demise of the Hornet. Dr. Go is one of those surly, no-jive dudes who comes in, does the job and gets

out. You can tell if he's enjoying the assignment by the amount of muscle he puts into it. He obviously *loved* this job! As I mentioned, the Hornet had been put through some tough times *before* this test; the front tires lacked tread, the rears lost most of the knobbies and the polycarb body needed new paint.

But the Hornet was holding up better than expected. The steering joints were getting a little sloppy, but the rear end gave *no* problems. The shocks had been refilled and resealed but, other than that, nothing! The motor was the same RS-540S can that had been originally installed. After thoroughly inspecting all the components and making some notes, we headed for the Track of Doom: the cinder-block factory and rock quarry!!

The first test in the series was the "leap the abyss" portion. This had the Hornet accelerating wildly down a concrete loading dock and leaping fearlessly across a wide open river of cinder blocks to a safe but abrupt landing in the dirt on the other side. If the speed was just right, the Hornet would remain in a normal attitude while airborne, gently hit the ground and go rocketing off across the dirt. We repeated this portion many times and discovered the meaning of trajectory and the importance of orbit-insertion speed. On more than one test



Not enough speed to go ballistic; the Hornet challenges a cinder block.

run, the Hornet got

off the dock at a speed or path less than ideal, dropped its bruised nose and tumbled, ungracefully, into the dirt on its back...or nose...or side. Tough little buggy kept on runnin'!

Phase two of this attempted automotive assassination consisted of a slight variation on phase one. The track portion remained nearly the same, but we added a slight ramp to better launch the Hornet on its merry way. We discovered speed again. A little too slow and the abused machine would leave the ramp, immediately nose over and head directly into the chasm (a straight vertical drop of about five feet). No problemo; takes a



*Above: The ultimate challenge—headlong, full-tilt into a cinder block wall. It was a draw; neither contestant broke!
Left: The Hornet rears up, pops a wheelie and attacks the adversary.*



The speed controller dust boot was not in particularly healthy shape after two years of hard running. Acoms radio did great!

bruising, keeps on cruisin'!

I should mention that Dr. Go was becoming somewhat irate with his inability to even slow down, let alone disable, our rugged little Hornet. The Dr., however, was beginning to feel the pressure and started to flex. The new adversary was something much more formidable than simple jumps or lofty flights. This was going to be tough. Headlong, full-tilt into a solid cinder-block wall!!! Now, in all fairness, this represented cruel and unreasonable punishment, but we did it anyway! Four times! The first clever observation we made was that the building didn't move a measurable amount; the second, and more amazing, was that the Hornet remained a survivor. The impact was absorbed by the bumper, which bent to a near-vertical position before



Rear-end view of the Hornet shows that the knobbies on the driving portion of the rear tires are history, but the shocks and suspension parts held up well—even to Dr. Go.

rebounding to its stock shape. Nothing we or, more embarrassingly, the Dr. could do could immobilize the Hornet. In a last-ditch attempt at supremacy, Dr. Go picked it up and hurled it a healthy distance, so further abusing its body but not its spirit. A dejected and defeated Dr. Go was last seen heading towards the West Coast, perhaps to seek employment

as a Hollywood extra, but more likely to some wimp magazine whose idea of testing is to subject the cars to photo lights!

This whole test really points out the ruggedness of and sound design that goes into a lot of the currently available cars. It's especially important in the case of the Tamiya Hornet, because it's a very popular car and a frequent choice of the newcomer to off-roading. A lot of drivers still consider it an ideal starting point.

This type of car is attractively priced and easily up to the kind of abuse we subjected it to. We've presented it here, not for you to duplicate, but only to give you an idea of the punishment it can take. In fact, we don't recommend you do this with your car, because it also beats up the radio. We've now apologized to the Hornet for subjecting it to this treatment, but with the apology came a promise for a complete rebuild; shiny new body, trick wheels and tires, suspension mods and *never* another encounter with Dr. Go. Stick around for the results!



Broad front bumper offers great protection, even against brick walls! Notice absence of tread on tires.



Track Report

Kyosho

RACING MONTERO

by JOE BRUNI



Sidewinder, Chaindriver 1/10-Scale Off-Road Gasser!!

THE PARIS-DAKAR ROAD RALLY is the ultimate endurance marathon, passing over the most rugged terrain imaginable between Paris, France, and Dakar, Senegal (Africa). In the extreme desert heat, with choking dust, the ride, as described by those who've survived it, is analogous to riding a bucking bull for days. It's definitely the survival of the fittest.

The Kyosho Racing Montero is the latest entry to the off-road, gas-powered racing scene by Kyosho of Japan, and is distributed





Photos by Rich Urawitch



four-wheel-independent suspension system is made of durable, die-cast aluminum suspension arms, and all wheels are integrated with Kyosho high-performance, fully adjustable shocks and then joined to an ABS plastic tub-style chassis. This chassis not only houses the radio gear but also doubles as a barrier against rocks. Attached to the main frame is an aluminum rear frame, and this is where

the gas-powered engine mounts and also where the sealed, rear-drive-train system is housed. The engine is sold separately, but Kyosho provides the necessary mounting hardware, muffler, air cleaner, fuel tank and clutch for several different models. I chose the O.S. MAX-10FSR for this track report.

Off-road traction is provided by four, block-tread tires mounted on strong, light, nylon racing wheels. To assemble the Montero you'll need screwdrivers, pliers and a hobby knife.

A 2-channel radio system is needed. I chose the Kyosho Pulsar 2000 Pistol-Grip Radio, which is an economical, 2-channel system with a quick-change right- to left-hand conversion and servo reversing switches. The Pulsar also includes two compact, lightweight, high-torque mini servos and one of the

(Continued on page 35)

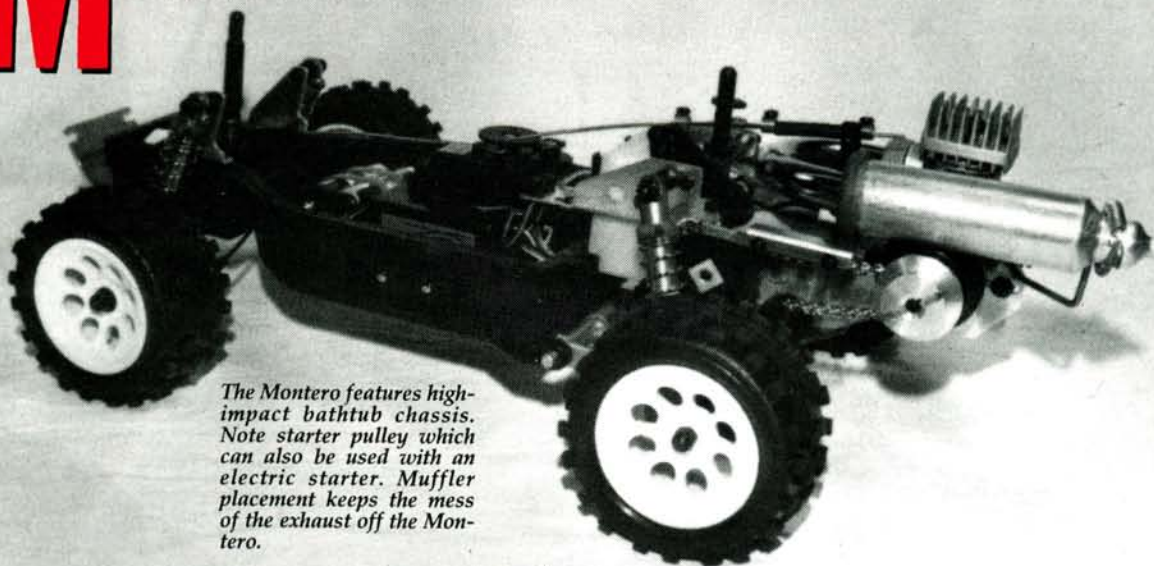
in the U.S. by Great Planes Model Distributors*. Modeled after the famous full-scale Paris-Dakar Road Rally champ, this 1/12-scale Montero

emphasizes the continuing Kyosho quest to be the dominant force in off-road racing.

THE KIT: Like all Kyosho products, the Racing Montero comes carefully packed. A 20-page assembly manual provides highly detailed construction diagrams, performance and adjustment tips as well as an in-depth troubleshooting guide.

The Racing Montero has several unique features. The

RACING MONTERO



The Montero features high-impact bathtub chassis. Note starter pulley which can also be used with an electric starter. Muffler placement keeps the mess of the exhaust off the Montero.

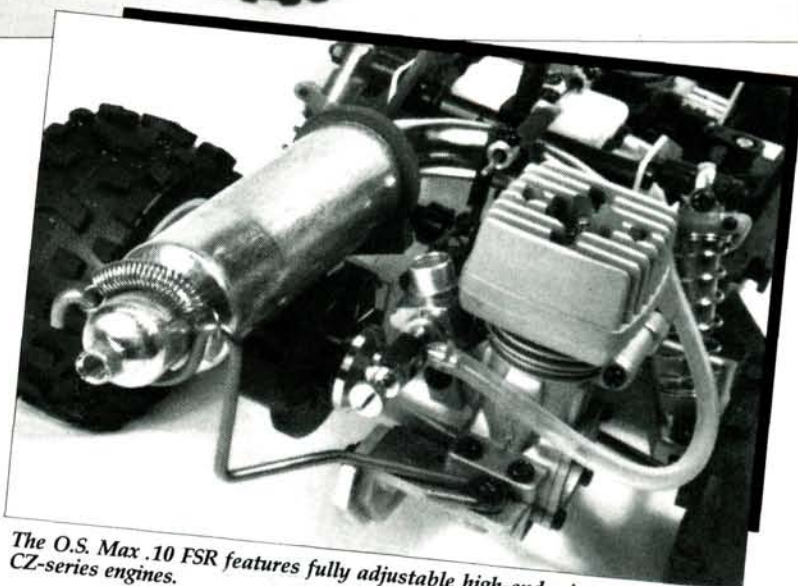
smallest radio receivers on the market today.

Some additional equipment that is not included but is necessary are a glow plug cord, dry cell 1.5V battery and a good-quality glow fuel with at least 10 to 15 per cent nitromethane.

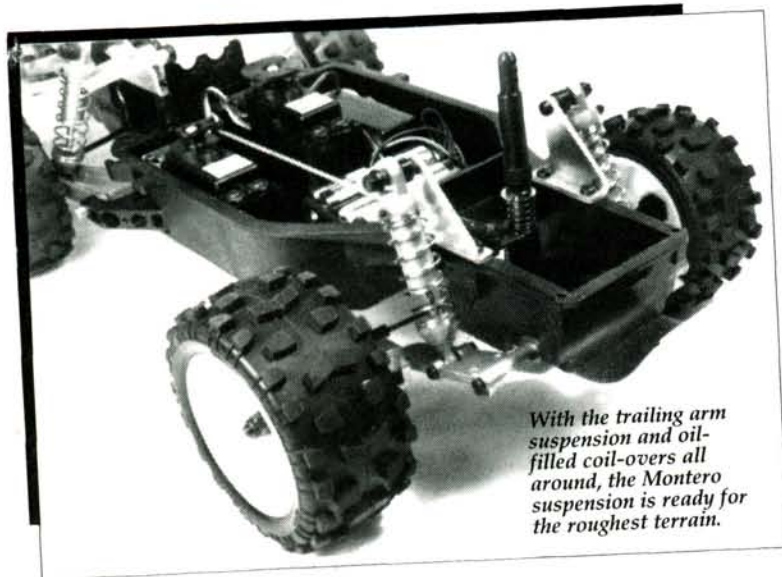
CONSTRUCTION: It took me only five hours to construct the Racing Montero.

Remember that all gas-powered models are notoriously prone to intense engine vibration and it's extremely important to use the good thread-lock compound which is included in the kit.

Assembly begins with the front



The O.S. Max .10 FSR features fully adjustable high-end mixture, unlike the CZ-series engines.

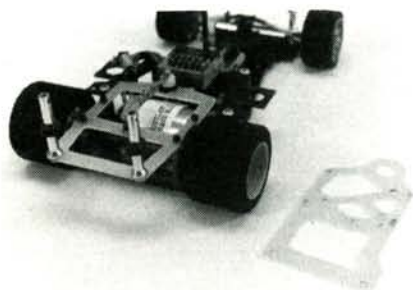


With the trailing arm suspension and oil-filled coil-overs all around, the Montero suspension is ready for the roughest terrain.

suspension system. The shocks are pre-assembled by Kyosho and require only the addition of the included shock oil. The assembly of the front assembly arm and installation of the front servo are straightforward. Upon completing the front-end suspension, I noted a great deal of laxity where the knuckle arms connected to the front suspension arms, and I thought that would hamper performance. Next came clutch assembly, engine mounting and rear frame assembly. Engine installation is easy if you use one of the recommended engines. As already mentioned, I used the O.S. MAX-10FSR and this fit flawlessly. During clutch installation the pilot shaft should be tightened to maximum torque. Add a

(Continued on page 54)

What's New



DAMPER PLATE

This replacement damper plate for the Associated 12I and 12L incorporates new body-post locations at the rear of the chassis. This makes mounting GT and Stock Car bodies a snap using short body posts. This system also holds the body steady to keep it from vibrating at high speeds.

For more information contact Outlaw Motor Sports, 1441 N. La Cadena, Colton, CA 92324.



MODIFIED CAR MOTOR

This new modified motor from Polk's matches the speed of any motor on the market, and at a very reasonable price. The motor has tunable timing and replaceable brush springs, as well as a hand-balanced armature. Get the new "Hot One" for off-road R/C cars.

For more information contact Polk's Modelcraft Hobbies, 346 Bergen Ave., Jersey City, NJ 07304.



CUSTOM RACING PRODS.

This new Wheel Adapter allows you to adapt Hot Shot low-profile tires and wheels to your Kyosho car.



CRP now offers direct-replacement wheels for your Fox. These wheels will also fit the Falcon, Striker, Wild One and Futaba FX-10.

For more information contact Custom Racing Products, 3250 El Camino Real-B3, Atascadero, CA 93422.



LOTUS HONDA 99T

Designed for on-road track racing, the Lotus Honda 99T captures the look and feel of Formula 1 racing. The Lotus Honda features a double-deck fiber glass-reinforced plastic chassis, three-point suspension, large rear oil damper and a 540 motor.

For more information contact Model Rectifier Corporation, 2500 Woodbridge Ave., Edison, NJ 08817.



ULTRA BRUSHES

The Ultra Brush has now been improved with a new compound that delivers more power to the commutator. The brush is designed primarily for use in 1/12-scale cars, but it can be used in 1/10-scale cars as long as it is replaced frequently.

For more information contact Associated Electrics, Inc., 3585 Cadillac Ave., Costa Mesa, CA 92626.



1/24-SCALE BODIES

Parma's 1/24-scale '86 T-Bird and Porsche 962 are the first of a series of Tamtech replacement bodies. Available in clear lightweight plastic.

For more information contact Parma International, 13927 Progress Pkwy., N. Royalton, OH 44133.

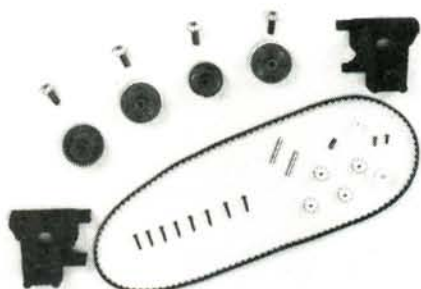


1/10 FRONT DONUTS

Eliminator Products has just introduced its new, 1/10-scale Front Donuts to its line of road-racing tires. These tires offer excellent traction and longer track life than the current color-dot tires. These are the most winning tires at the SRS Raceway in Tempe, AZ.

For more information on Eliminator Products contact Scale Racing Sports, 1120 N. Hayden Rd., Tempe, AZ 85281.

Descriptions of new products appearing on these pages were derived from press releases supplied by the manufacturers and/or their advertising agencies. The information given here does not constitute endorsement by **Radio Control Car Action**, nor guarantee of performance or safety by **Radio Control Car Action**. When writing to the manufacturer about any product described here, be sure to mention that you read about it in **Radio Control Car Action**.



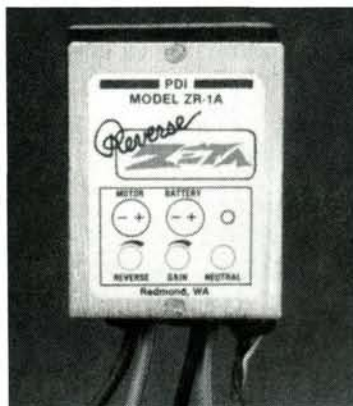
GREAT PLANES

Kyosho introduces the new Belt Drive Conversion Set for the Optima family of cars. This complete set includes everything you need to convert your Optima, Javelin, Turbo Optima, or Salute to belt drive. The Belt Drive Conversion Set has a steel-reinforced belt for long life, and new differentials with metal bevel gears. With this conversion, your Optima will be faster, run longer and have fewer breakdowns than ever before! There's also a Belt Drive Conversion Set for the gas-powered Stinger, too!



The Option House Platinum Shocks are specially designed to allow instant adjustment without the hassle of shock disassembly. Simply turn the ball end, and you're ready! The Option House Platinum Shocks are available in two sizes; short (3 inches), and long (4 inches), and they'll fit many of the most popular 1/10-scale buggies. They come with three different spring sets, so modelers will easily be able to change the spring tension.

For more information contact Great Planes Model Distributors, P.O. Box 4021, Champaign, IL 61820.



REVERSE ZETA

Product Design Inc. announces the arrival of the Reverse Zeta, a rugged, reliable, reverse speed controller. This all-electronic (no relays) fully proportional reverse-speed controller uses 6- or 7-cell battery packs. It features reverse-speed limit-adjust and proportional brake band. Great for cars and boats and super for monster trucks! It's totally waterproof and comes with a 90-day parts and labor warranty.

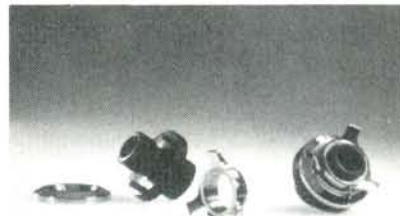
For more information contact PDI, 16922 N.E. 124th St., Redmond, WA 98052.



PINION WRENCH

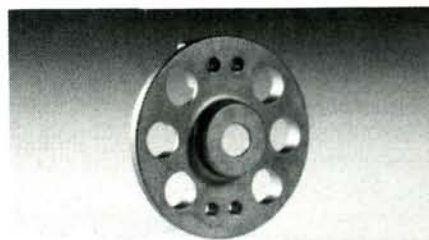
The machined precision wrench developed by Team Losi will give you the security of strip-free pinion tightening. Features include a machined, anodized aluminum handle and a precision-ground tip made of drill blank. Replacement tips are available.

For more information contact RPS Distributing, 1655 E. Mission Blvd., Pomona, CA 91766.



SUN PRODUCTS

Sun Racing Products has just introduced its line of Knock-Off Hubs for virtually every 1/4-scale car on the market. The hubs are machined from top-grade 6061-T6 aluminum on a computerized milling machine for a perfect fit. These Knock-Offs are available with a chrome, black, red, blue or clear anodized finish.



Have you ever stripped the threads on the mounting plate of your Kyosho-type motor? Sun Racing Products has just introduced a replacement mounting plate to fit all Kyosho-type motors. Simply push out the roll pins holding the damaged end plate and replace it with Sun's new end plate. To ensure a long life and tight tolerances, the end plate is machined of 6061-T6 aluminum on a computerized milling machine. For more information on this and other top-notch Sun Racing accessories, contact Sun Racing Products, Tidswell Ave., Medford, NJ 08055.

Troubleshooting

by FRED MURPHY

IT'S FINALLY HAPPENED; a dream come true: your first R/C car. We have you now! When you've been bitten by the R/C bug, it's all over. Forget the lawn-mowing and the football games—you're an R/Cer now.

Don't foolishly think that a radio-control car is a toy, as it's a highly advanced machine and deserves to be treated as such. I'm sure that many of us have bought full-size cars costing *less* than is invested in many of the R/C cars on the market today. If you've just acquired that long-awaited, dream R/C car, please treat it as if it's the first full-size car you worked so hard to buy. The radio-control hobby should be enjoyable and not an unfortunate, costly experience. How do you make it an enjoyable experience? It's simple. A little common sense, a little maintenance and a lot of practice, and you'll have years of pleasure with no regrets.

Common sense dictates that you should keep in mind some basic dos and don'ts. First, *do* take your time when assembling the car, following the manufacturer's instruction book carefully. Manufacturers and translators are now very good at making the instructions as comprehensive and as easy to follow as possible. Second, solder the wire connections instead of just wrapping or twisting the wires together. In the long run you'll have many fewer problems if the connections are made permanent. Third, make sure that the battery pack for your car is fully charged. New battery packs don't come charged from the manufacturer. A nice, slow, trickle charge is always the best way to prepare a new pack, so plan ahead and put your pack on charge well in advance of when you'll be ready to use it.

Once on the road (or dirt), make sure that you have plenty of running room. Stay away from streets where you could



Trickle-charging is an important step in breaking in a battery pack, as is keeping it at 100 per cent capacity. Trickle chargers, like the unit from Royal, will charge 7.2V and 8.4V packs.

accidentally let your R/C car wander, and so get totally destroyed by passing vehicles. You might laugh at this but it *can* happen, so use your common sense.

Avoid water at all costs. I don't care what your friends say about their cars being waterproof; keep one, basic, scientific principle in mind: water and electricity don't mix! You can short a car's electrical system or radio system really quickly by making a pass through a puddle to see how far the water will splash. If you do hit water accidentally, grab a hair dryer and dry the car as soon as possible. You might just avert a costly mistake.

One of the greatest habits you can get into is to maintain your car as if it were a full-size vehicle. You've heard the saying "You can pay me now or you can pay me later"—that's not just a familiar cliché. Take the time to clean your car after each use. Ten or fifteen minutes of daily cleaning is a lot better than having to eventually tear the whole car apart because you've been too lazy to maintain the car when it needs it. Get out that old toothbrush and brush off any dirt that's around the axles or front hubs. Wipe the body off, or even *take* the body off and wash it down with soap and warm water.

"Don't Be Foolish"

Remember that most bodies are made of Lexan, and one reason for painting them from the inside is to help keep the new look. A little soap and water on the outside won't harm the paint job which is on the inside. Remove the wheels for a thorough cleaning. Much of the dirt they pick up will be on the *inside* of the rim, so take them off to clean them out. If you have a 2WD car, clean the front spindles and regrease them.

If your car has wheel bushings instead of ball bearings, check them often for wear. Wheel bushings are very inexpensive so don't hesitate to replace them if they're worn. If your car has ball bearings, keep them clean and well oiled, and check them for any binding that will prevent the components from turning freely. Binding greatly hinders performance and, in the long run, damages more than just the bearings. Spend a few minutes now on preventive maintenance, and your R/C investment won't end up in the junk pile. Don't take your car for



It's important to keep a full range of cleaning solutions and lubricants handy for your daily maintenance. BoLink offers a good line to choose from.

granted; it's not self-cleaning.

Now comes the fun part—practice. Run the car in circles, then away from you and towards you. Just practice, practice, practice! One of the best ways for a beginner to get used to driving a car is to practice on a simple course that can be set

(Continued on page 62)

SOLDERING

The Art Of
A Good Connection

BASICS



These soldering irons, solder, shrink-tubing, desoldering tool, side cutters, connector-pin pusher, a piece of scrap wood and wire strippers (not shown) are all the tools you'll need to make virtually any solder joint.

by STEVE POND

OF ALL THE TASKS that must be performed by the R/C car enthusiast during routine maintenance and basic repair, soldering is the one I see fouled up most frequently. As you progress to higher levels of competition, or even to more advanced scale kits, the requirement to solder on your own will surely arise. You'll have to solder connectors, motors and capacitors, and also when constructing your own

battery packs and "hard wiring" the entire electrical system.

TOOLS: Soldering tools are basic and relatively inexpensive. I'll review some of these and point out their advantages and disadvantages.

The most widely used solder consists of 60 per cent tin and 40 per cent lead (generally referred to as 60/40 solder). There are other, slightly cheaper, solders available (e.g. 50/50 or 40/60) but they don't make as strong a connection. A flux is also needed as a "wetting agent" to help the molten solder spread and penetrate. Rosin-core solder, where the center of the solder is hollow and the proper rosin flux is injected, eliminates the need for the separate flux. This is the variety of solder that I recommend for all R/C-related work. Acid-core solders shouldn't be used for electrical soldering because they are corrosive and will eat away the wiring.

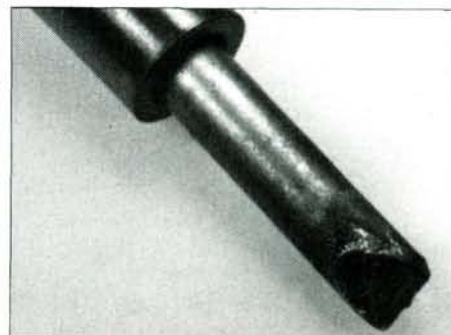
There are many varieties of soldering iron but only a few are suitable for modeling.

The pencil-type soldering iron in the

25- to 50-watt range is suitable for most soldering chores on R/C cars. Weller soldering irons work very well and can be purchased for a reasonable \$12 to \$15. I use a 25-watt iron for very light work (e.g., on servo connectors) and also for some wiring repair. A 40-watt iron is required for soldering motor capacitors and for battery pack construction. If you're buying only one, choose the 40-watt iron, as it will handle most of the heavy work and, with a little care, the



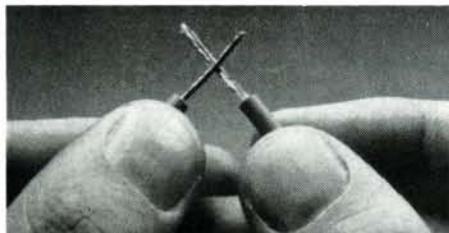
A properly "tinned" soldering iron will transfer heat more efficiently. Tinning is accomplished by applying fresh solder to a hot soldering iron and then quickly wiping with a wet rag.



This is what a neglected soldering iron looks like. This is usually the result of overheating.



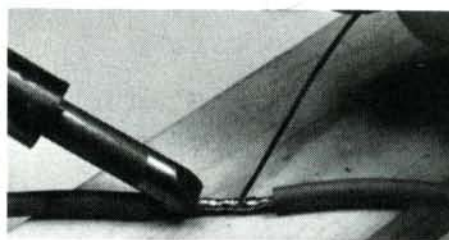
When connecting two wires, the first step is to strip off about 3/4 inch of insulation and neatly twist the exposed wires together.



Cross the exposed wires at the midway point and wrap them around each other for a fool-proof connection when solder is applied.



This is what the wires should look like prior to applying the solder.



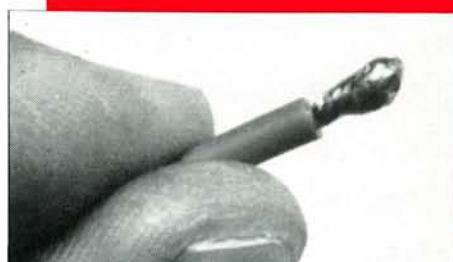
When soldering, apply the solder to the connection, not to the soldering iron, to obtain the best results. Solder on a piece of scrap wood to prevent heat from being extracted and also to prevent damage to table-top.



The finished solder joint should look like this.



To protect the soldered connection, use some heat-shrink tubing.



Tinning the exposed wire is helpful when soldering wires to objects like motors.

light work as well.

Other types of soldering equipment are the soldering gun, work-station pencil iron, butane portable iron and 12V pencil iron.

The soldering gun usually has a two-position trigger for high and low wattage operation. The gun is good for heavy work because of its high wattage capacity. It heats up quickly, but is a little too clumsy for delicate work. Further, when improperly used, it can overheat and damage your material. Prices for these guns range from \$25 to \$60.

The work-station pencil-type iron is great for R/C work because it's small enough to do the job, and is hot within seconds. The base of the work station contains a spring cup to hold the iron when it's not in use, and the iron usually has adjustable temperature settings. The only negative aspect of this type of soldering iron is the price, which ranges from \$75 to \$150.

For portable, at-the-track repairs, the 12V and the butane pencil-type irons are good. The 12V soldering iron connects to a car battery for quick repairs that you would otherwise have to head home for. These 12V irons usually have enough heat to perform any operation, but they act as a discharge resistor on your battery and extensive use, especially when used concurrently with a DC battery charger, will drain your battery.

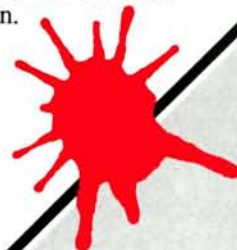
The butane-type soldering iron doesn't need an external power source so it can be used right on the starting line. Because the tip is heated with a direct flame, heat-up is rather rapid. As with the soldering gun, high temperatures are reached and these irons should be used with care. Don't use the butane pin-point-type torches, as they generate up to 5,000 degrees of heat and could cause extensive damage to wiring insulation and other heat-sensi-

tive items.

Other supplies you might consider adding to your tool kit are a pair of wire strippers, some heat-shrink tubing for insulation and a desoldering tool.

Now to the actual soldering. Soldering has many applications and I'll give you a few ideas to make it a little easier.

CONNECTING WIRES: I've seen various ways of connecting two wires, but there's one way which seems to be the cleanest and easiest. Start by stripping about 3/4 inch of insulation off the end of the two wires to be joined. Slip an appropriate-size piece of heat-shrink tubing over one of the ends, and move it away from the area to be soldered. Cross the two ends at a 45-degree angle and twist them around each other so that they look like a single piece of wire without insulation (see photo). Place the bare wire on top of a spare piece of wood and heat it with a soldering iron. Use wood because, if the work is performed on a metal surface, it will "soak" the heat right out of the piece you're trying to solder. Every couple of seconds, touch the wire (not the soldering iron) with the solder to see if it has reached an adequately high temperature. When the wire is hot enough, the solder will flow over the wire, making a solid, highly conductive bond between the two. Slide the shrink tubing over the soldered area, and apply heat with a match, and you've got a great, conductive, well-insulated connection.





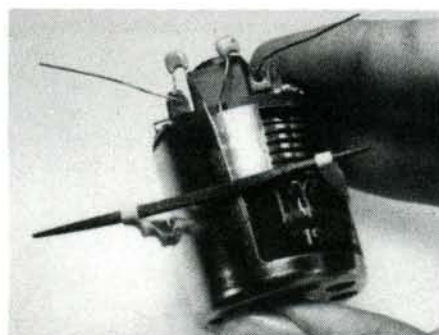
Soldering guns with high-wattage ratings are good for heavy-duty work such as soldering battery cells, but should be used with caution to prevent overheating.

MOTOR CONNECTIONS: Soldering anything to an electric motor requires a more powerful soldering iron because the metal in the motor draws the heat away from the soldering iron. Use an iron of at least 40 watts. When soldering wires to the motor, it's best to "tin" the wire beforehand. "Tinning" simply means applying solder to the end of the wire before making the actual connection. This allows you to hold the wire and apply the heat without the help of a third hand to apply the solder.

On a stock motor, capacitors are tricky to solder if you've never done it before. Soldering capacitors on a modified motor is rather easy, because there are two points to solder to on top of the can. A stock-class motor has only one of these points, and the other end of the capacitor must be soldered to the motor can. To solder anything to the can, the paint or chrome must first be removed in order to provide some fresh metal for the solder to stick to. Use a small file to clear away a small section of the coating. When both capacitors are connected to the points on the motor endbell, prepare the other ends to be soldered to the motor can. These ends can be held in place with a toothpick and a rubber band until enough heat is generated for the solder to melt. Just remember to apply the solder to the motor can and *not* to the soldering iron. When the solder is applied to the iron, it will melt into a ball on the can because not enough heat has been transferred



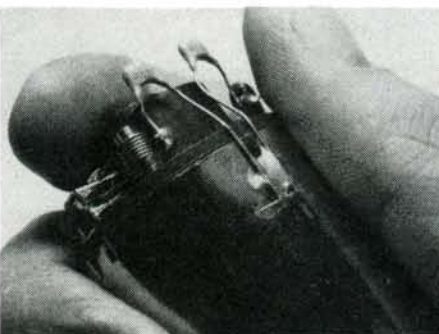
When soldering capacitors to stock motors, to make a good solder joint you must use a file to remove any paint or chrome.



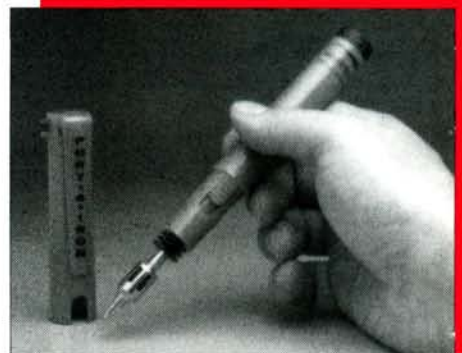
To hold slippery capacitor ends to the can for soldering, household items such as a rubber band and a toothpick are helpful.



When soldering, apply heat primarily to the can, as it will soak up more heat than the capacitors. If the heat is applied to the capacitors, they will be overheated and probably damaged.



The finished job should be clean without any excessive solder.



A portable, butane soldering iron is ideal for last-minute "at-the-track" repairs.

from the soldering iron to the can.

CONNECTORS: When changing a connector, it's best to solder it on so that it won't pull loose. Some claim that their connectors are "solder-free," but these connectors will pull free just as easily as the rest of them do. Wrap the connector pin around the bare wire and crimp it to hold it in place. Then, for the best connection, apply solder to the pin where the wire passes through. Use only just enough solder to make the connection, as too much solder will interfere when you try to push the pin into the connector. If you get a polarity backwards, a handy tool to have around is a pin pusher. The one from Aerotrend* can be used to remove the pins from the connector so that they can be switched around instead of having to cut the whole thing off and start again!

When soldering, just remember to apply heat correctly, apply the solder to the item to be soldered and *not* to the iron, make sure enough heat has transferred to the item before applying solder, and exercise extreme care! These soldering irons generate a great deal of heat, and they can cause severe burning of the skin and of the work surface. If you're a young modeler, *don't use a soldering iron without parental supervision.*

*The following is the address of the company mentioned in this article:

Aerotrend, 31 Nichols St., Ansonia, CT 06401. ■

Mounting

RADIO EQUIPMENT

by RICH HEMSTREET

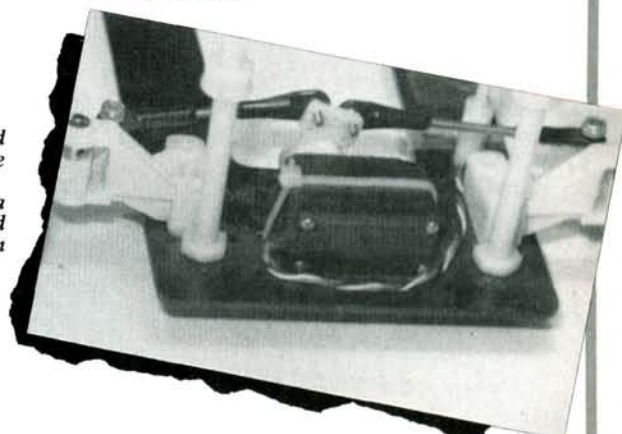
The only thing that should be moving your radio around, is you.

WHEN YOU MOUNT your radio equipment, you want it to stay where you put it. The normal abuse encountered when racing should leave your radio unmoved. However, when you're ready to move your equipment to another car, moving it shouldn't be a big problem.

Many 1/10-scale off-road cars provide mounting blocks for securing the steering servos. You attach these blocks to the servos with self-tapping screws, and then screw the blocks to the chassis. This system usually makes for a bulletproof arrangement, if you don't accidentally

strip any of the screw holes by overtightening. Besides the problem of overtightening, if you remove the screws frequently, you may eventually strip the holes out. I suggest that you use a small, nylon wire tie (instead of the screws) to fasten the mounting block to the servo. To remove the mounting block from the servo, simply cut the tie.

Left: Wire ties are used instead of screws in the mounting blocks.
Right: Servo tape and a wire tie securely hold the steering servo in place.



ULTIMA VOLTIMA

The Voltima conversion allows you to mount a 7.2V or 8.4V battery pack completely inside your stock Ultima chassis.

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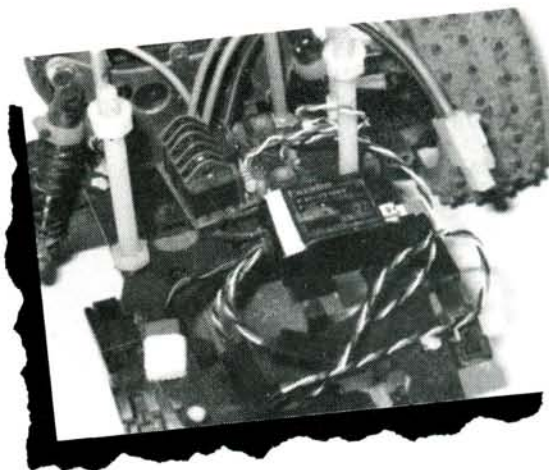
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Radio Equipment



The receiver and electronic speed controllers can usually be mounted with just servo tape.

Wire ties can also be used in place of the mounting blocks; just thread the tie through the screw holes in the chassis and loop it around the steering servo. If you use this method, you should also use good-quality servo tape between the servo and the chassis. I've found that BoLink's* servo tape works best.

On-road cars sometimes use mounting blocks but, more often, the instructions suggest that the steering servo be servo-taped into place. Don't rely on the tape alone; always try to make the steering servo more secure. Again, I recommend using a wire tie. Nylon strapping tape also works well. When both nylon strapping tape and servo tape are used, the servo is immovable. Steering servos take a tremendous pounding. If they're not mounted securely, your racer's steering will become very sloppy. The servo case will move back and forth, and the tie rods won't move consistently. If you're not careful, the steering servo will rip off the chassis and you'll be out of the race.

Mounting receivers is not as difficult as mounting steering servos. If you can mount them in a location where they can't take a direct hit, servo tape alone should be sufficient. High-quality Velcro can also be used for mounting receivers in a safe location. That way, you can easily move your receiver from one car to another. If there's a possibility that the receiver will be hit by another car, you should make it more secure. Use the servo tape or Velcro in conjunction with strapping tape for greater safety.

Electronic speed controls can usually be mounted using methods similar to

those used to mount receivers. Some controllers' cases come apart more easily than others. To hold them together, you can use a thin piece of strapping tape around the controller case before you mount it to the chassis. Be careful with electronic speed controls; you don't want anything to touch the resistors.

When attaching a servo-mounted rheostat speed control, you have to mount the servo very securely to the chassis. Both servo tape and a wire tie (or strapping tape) should be used. The weight of the unit could cause it to rip loose upon heavy impact. The rheostat bracket must also be firmly attached to the servo. You have to be sure that the rheostat and wiper arm remain in proper alignment, no matter what sort of wreck you're in.

Many 1/4-scale cars even mount their 5-cell receiver packs only with Velcro. I was skeptical when I first saw this, but I haven't seen a pack come loose yet.

I frequently have to move radio gear from one chassis to another. When you start to move a servo, you'll be very happy you resisted the idea to use cyanoacrylate to glue it in place. Another reason for using the BoLink servo tape is that it's easy to peel off the servo, after you pry the servo from the chassis.

If you take care in mounting your radio equipment, it won't cause you any problems on the track.

**The following is the address of the manufacturer mentioned in this article:*

BoLink R/C Cars, Inc., 420 Hosea Rd., Lawrenceville, GA 30245. ■

MONTERO

(Continued from page 35)

generous amount of thread-lock compound to avoid having the shaft loosen at high rpm. The sealed rear-drive system is pre-assembled by Kyosho. The manual suggests applying additional oil filling to the rear box to avoid premature gear wear.

Chain adjustment is vital at this point. The manual suggests no more than 3mm of play. Too much play or over-tightening the chain tension can result in irreversible gear damage. This adjustment is easily accomplished by sliding the rear engine mount forwards or backwards as necessary. If, after racing the Montero, you are unable to adjust the chain because of excess stretching, simply follow the step-by-step instructions to remove a link from the chain.

Now for attaching the rear frame to the main frame, along with the rear suspension system. Two die-cast aluminum suspension arms are attached to the frame with oil-filled dampened shocks. Power is transferred from the gearbox to the rear two wheels by two hardened-steel, dog-bone swing shafts.

Fuel tank assembly requires some

bending and shaping of fuel tubing along with final connection to the O.S.'s carburetor. Muffler assembly and installation follow this.

Radio installation is easy. To fit properly, the Pulsar's mini servos required only the use of the provided servo adjustment plates. A long steering rod connects the steering servo to a servo saver mounted on the main frame. The two-part throttle rod attaches both to the carburetor and to a unique brake apparatus. When the Pulsar's pistol trigger is depressed, the carburetor opens to accelerate. When the trigger is pushed forward, the brake lever touches the chain and slows or stops the rear tires depending on how much braking is desired. Extra time should be spent on making precise adjustments. Add the battery box and the power switch plate and the radio system is complete. Included in the kit is a durable chassis cover that envelopes the radio system and protects it from rocks, debris and dirt.

Lastly comes the wheel assembly and mounting, as well as body preparation and detailing. The Montero body is made of high-impact Lexan and requires that paint be applied from underneath. I enjoy

this part of construction because it allows for creativity. The final steps of assembly are the roll-cage and air filter installation, and we're then off to Pareee!

PERFORMANCE: After a final radio system check, it was time to crank the O.S. engine. There are two methods of starting the O.S. MAX-10FSR. Included in the kit is a rope-style pull cord or, as I chose, an optional 12V electric wheel starter which is simply pressed against the engine's flywheel and rotates the motor by friction. Just attach the 1.5V battery and glow plug to the engine, and you're ready for action.

All gas-powered engines require break-in time for maximum performance. At rich setting, use 6-8 tanks of fuel and run at varying speeds and on a flat ground which won't stress the engine during break-in.

I've tried various blends of racing fuel and have found that a 10 per cent nitromethane mix is optimal for both high-speed and rough-terrain performance. The engine needed some initial carburetor adjustments to maximize the air/fuel mixture, and then, finally, I was

(Continued on page 59)

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- Working wheelie bars (funny car only).
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These cars come fully assembled from the factory to insure quality workmanship.

ELECTRICAL OPTIONS:

Economy - Pre-wired speed control with reverse stock motor with plugs \$39.

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Assembled 1/10-scale Firefox funny car \$149.

Assembled 1/12-scale Firefox funny car \$119.

Assembled 1/12-scale Firefox rail \$129.

Assembled 1/10-scale Firefox AA fuel rail-call for price.

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MONTERO

(Continued from page 54)

ready for some serious Baja terrain.

The Montero was extremely quick and very responsive but, about 10 minutes after my initial test run, it wouldn't move even though the engine was still screaming. After inspecting it, I realized that the pilot shaft had loosened, so I headed back to the pits. I had neither used enough thread-lock compound nor tightened the pilot shaft to maximum torque. The screaming engine was my reward!

For my next test run I went to a more challenging racecourse with steeper grades and much rougher terrain. The Montero easily fought its way up and over the hills. The rear-engine design seemed to improve the car's rear-tire traction and also its climbing abilities—not to mention the consistent rear wheel landing after every jump. The Montero cornered extremely well, owing to its excellent weight distribution and center of gravity. It slid easily out of each turn and never overturned. The only performance flaw was that since the front knuckle arms worked loose, the front wheels chattered (bounced) too much on smooth terrain.

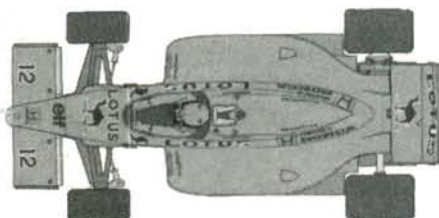
The advantage of gas-powered over electric-powered cars is that a tank of fuel lasts approximately 20 minutes and allows more track time and enjoyment than a battery does. Also, unlike electric-powered cars, gas-powered models can be run without the hassle of recharging battery packs. Just add fuel and go!

The sound, power and speed of the Racing Montero make it an exciting off-road buggy. Since it's a 1/12-scale car, it can be run on any off-road track. Kyosho offers a complete line of optional equipment, including a variety of on- and off-road tires, ball bearings and performance shocks.

If you're not planning an exciting, real-life Paris-Dakar journey soon, the Kyosho Racing Montero is the next best thing. Believe me!

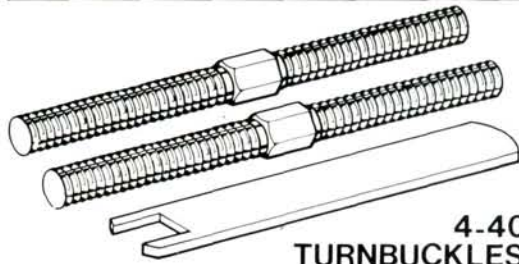
**The following is the address of the Kyosho Racing Montero's U.S. distributor:*

Great Planes Model Distributors, P.O. Box 4021, Champaign, IL 61820. ■



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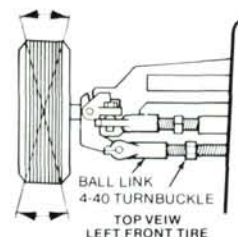


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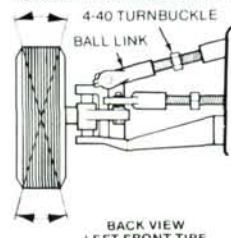
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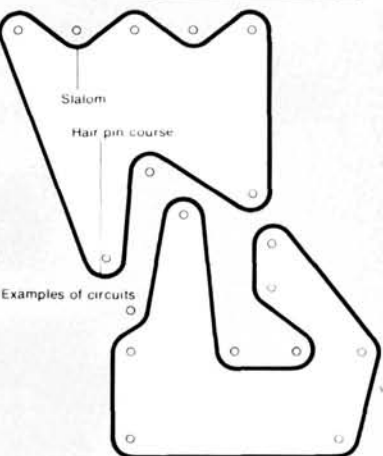
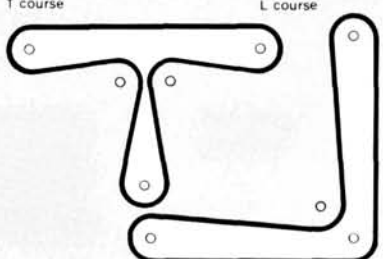
TROUBLESHOOT

(Continued from page 40)

up anywhere. Make a slalom course in your driveway or backyard by setting up six or eight empty soda cans. Practice driving your car around the cans, slowly at first and then gradually building up speed as your skill increases. If you can master this basic exercise, you'll find that handling your newly acquired car is both easy and entertaining. Most racing facilities (in particular, off-road) have a series of both left and right turns, so your practice track will help to make your first appearance at the race track more im-



Slalom race



Practice courses can be set up in your driveway or backyard using markers such as empty soda and coffee cans.

pressive. Of course, if you have an R/C track nearby, what better place is there to practice? Practice will make you perfect, or as close to perfect as possible.

Now you're on your own. Just remember to use common sense, spend about ten to fifteen minutes on daily maintenance and, provided you don't hit any brick walls, you'll do well. And practice, practice, practice! GOOD LUCK AND HAPPY MOTORING!

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RADIO CONTROL Ferrari



Vehicle: Robbe Testarossa

Scale: 1/10

Weight (w/battery): 4 pounds, 10 ounces

Body Material: Injection-molded ABS plastic

Chassis Type: Monocoque ABS plastic

Motor: RS 540S

Vehicle: Tamtech Testarossa

Scale: 1/24

Weight (w/battery): 10.4 ounces

Body Material: Injection-molded ABS plastic

Chassis Type: Monocoque ABS plastic

Motor: FK-180SH

Vehicle: ABC Testarossa

Scale: 1/24

Weight (w/battery): 8.9 ounces

Body Material: Polycarbonate

Chassis Type: Double-deck graphite

Motor: M&Y FK-180SH

SO YOU WANT a Testarossa? No problem! That'll be \$125,000; thank you very much. What's that? You say that after this month's mortgage payment you're only \$126,000 short?... too bad; bye, bye! But wait, you didn't say what scale.

If the Testarossa is your dream car, but the price is the nightmare that separates you from the dream, the following pages give a 1/10-scale and two 1/24-scale options for you to look at. The Robbe 1/10-scale version is a model that would dress up any mantelpiece in spite of the fact that it's a mid-motor design with a sophisticated suspension replete with oil coil-over shocks.

The 1/24-scale Testarossa offerings are from ABC Hobbies, and the well-known Tamtech series is now expanded with the addition of the

Redhead. Responding, as we must, to you, the readers, and your calls for more shoot-outs, we've matched up these two cars; the results are decisive. I found it very interesting how the ABC car was so strikingly like a scaled-down version of a 1/12-scale or 1/10-scale car like the ones tearing up superspeedways.

Whether it's a Testarossa, an AC Cobra or a '55 Chevy, it's obvious why we find varied scale renditions of our favorites in the model domain. The Testarossa is the favorite of many so, if a few more scale options in the Ferrari department arise, don't be surprised.

As for the full-scale, the Ayatollah of Radio Controlla, Louis DeFrancesco, hasn't let me drive this one yet. Maybe he's afraid I'll head straight for the wasteland, never to be heard from again... maybe he's right! ■

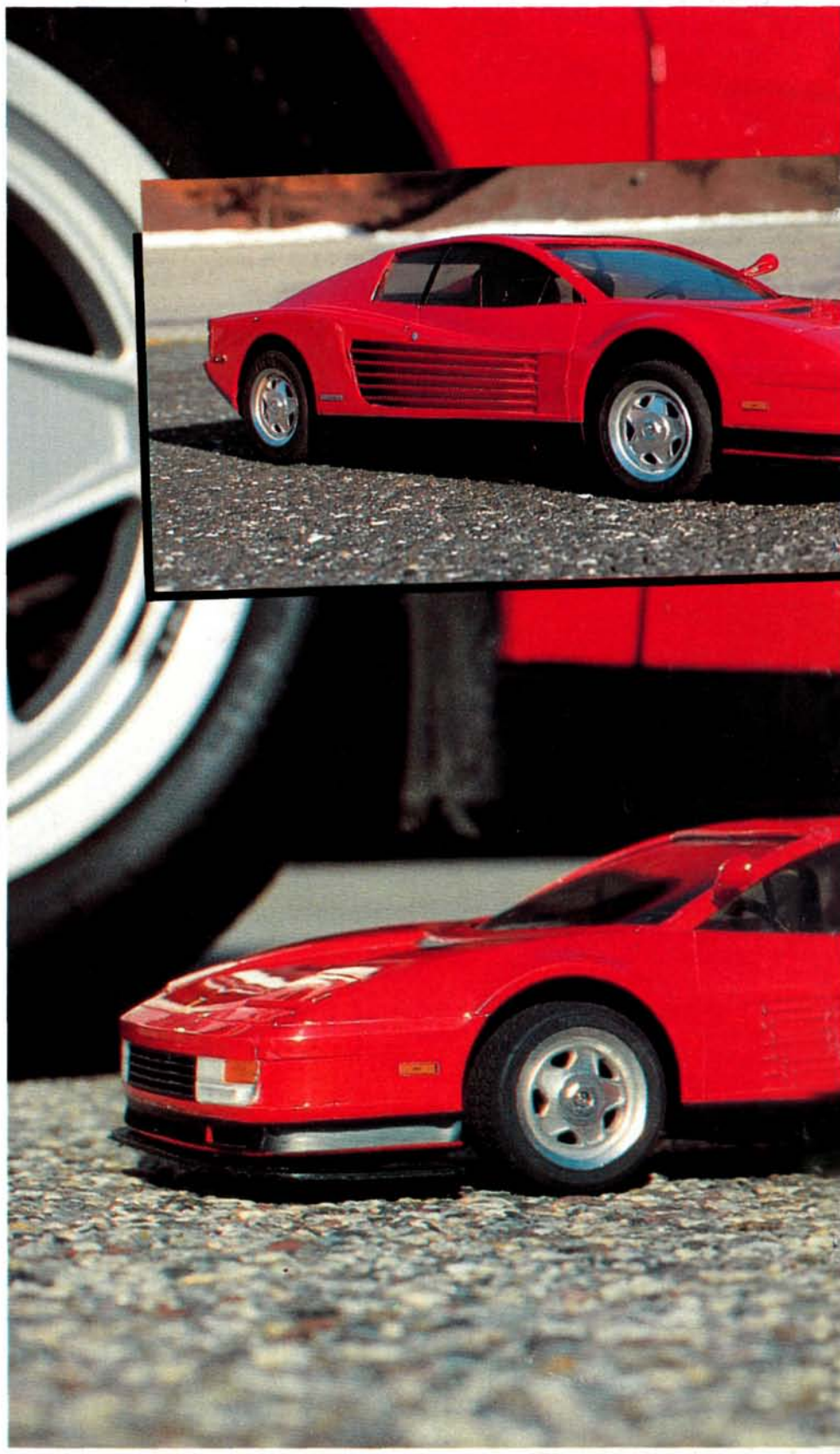
Track Report



by STEVE POND

Vehicle: Robbe Testarossa
Scale: 1/10
Overall Length: 17½ inches
Width: 7¾ inches
Height: 4½ inches
Wheelbase: 10 inches
Front Track: 5⅞ inches
Rear Track: 6 inches
Weight (w/battery): 4 pounds, 10 ounces
Body Material: Injection-molded ABS plastic
Chassis Type: Monocoque ABS plastic
Drive System: Primary spur gear, secondary bevel gear
Suspension Type
 (front): Double wishbone
 (rear): Double wishbone
Tires (front): Scale rubber Goodyear
 (rear): Scale rubber Goodyear
Shocks: (6) Oil-filled coil-over
Motor: RS 540S
Speed Controller: Three-step forward and reverse
Bearing Type: Ball bearing
Battery Type Required: 6-cell flat

A Mid-Engine 1/10-Scale Ferrari With Detail To The Max!



Photos by Louis DeFrancisco

ROBBE

TESTAROSSA



THE TESTAROSSA is the ultimate statement in automotive design. Anyone who has picked up a copy of a top auto mag since 1985 will have come across the Ferrari Testarossa at least a few times. It's for this reason that the Testarossa needs no further introduction.

Robbe Model Sport® has introduced its own 1/10-scale version of the Testarossa which, in a picture without reference to scale, can't be distinguished

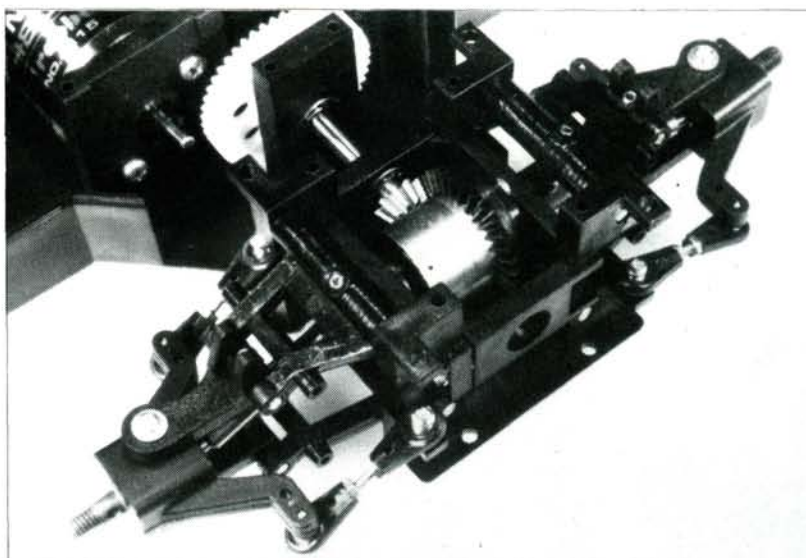
from the real thing. Like the vicious wolverine, the Testarossa holds its nose to the ground; seemingly humble, but secretly awaiting its prey. The Testarossa broadens at the rear, as if to ensure adequate stability when the time comes to pounce. Although this scale version of the ultimate Ferrari lacks the subtle, distinct growl of its full-scale counterpart, it retains the awesome presence which seems to be exclusive to this, the world's most sublime automobile.



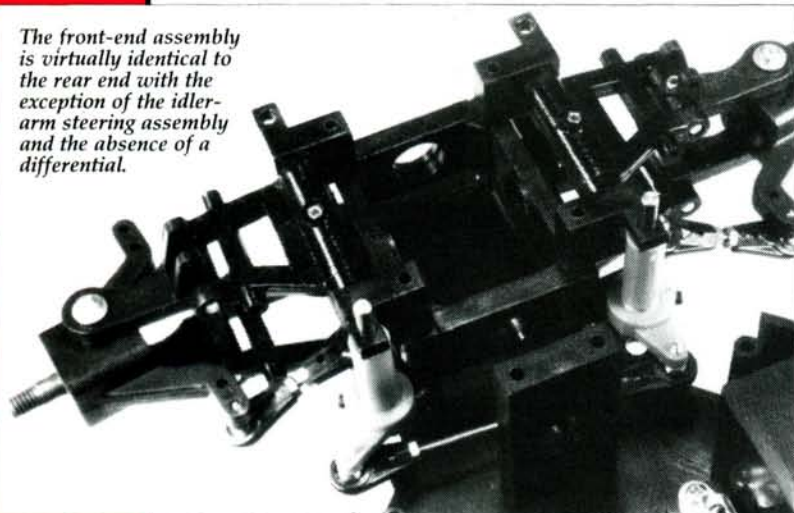
ROBBE



Bevel-gear differential and fully independent suspension keep the Robbe Testarossa tracking in a straight line.



The front-end assembly is virtually identical to the rear end with the exception of the idler-arm steering assembly and the absence of a differential.

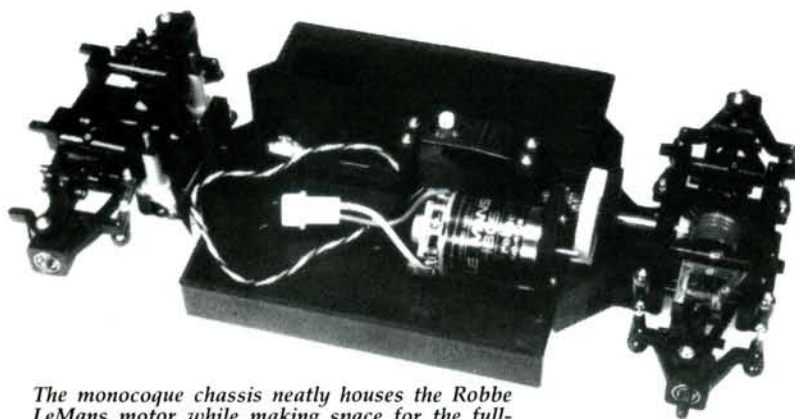


THE KIT: The Robbe version of the screaming redhead is the only model approved by Enzo Ferrari. It's to scale in every detail except for the absence of the black, wing-like vanes just behind the doors, which direct airflow into the flat 12's radiators. The incredibly detailed body is finished with a beautiful red lacquer, which is supplied by Ferrari and keeps the scale car as identical to the full-scale car as possible. The Testarossa rides on a set of scale Goodyear Eagle VR tires. That's right—scale tires! The tires are rubber and to scale right down to the pattern and depth of their tread. These tires ride on a set of scale wheels with the Ferrari name and rim number

cast into the wheel. The car even has headlights (they *do* go up and down) with lenses which are scale duplicates of the real ones.

Supporting all this scale hardware is a monocoque chassis that really distinguishes this particular Robbe kit from the rest. The previous Robbe kits had excellent scale details, but the drive systems lacked any resemblance to those of performance R/C cars. Although these were

(Continued on page 112)



The monocoque chassis neatly houses the Robbe LeMans motor while making space for the full-feature lighting system.

Track Report



ENZO'S MISSILE IN 1/24-SCALE

MRC/
Tamtech

FERRARI TESTAROSSA



by T.J. LYN

Vehicle: Tamtech Testarossa

Scale: 1/24

Overall Length: 7 1/2 inches

Width: 3 9/16 inches

Height: 1 13/16 inches

Wheelbase: 4 1/8 inches

Front Track: 2 3/8 inches

Rear Track: 2 3/8 inches

Weight (w/battery): 10.4 ounces

Body Material: Injection-molded ABS plastic

Chassis Type: Monocoque ABS plastic

Drive System: Spur gear

Suspension Type

(front): Coil spring

(rear): Coil spring w/parallel locating arms

Tires (front): Foam

(rear): Foam

Shocks: None

Motor: FK-180SH

Speed Controller: Electronic

Bearing Type: Plastic bushing

Battery Type Required: 7.2V 270mAh 6-cell

IN THE FIRST QUARTER of 1987, MRC/Tamiya* introduced the Tamtech line of 1/24-scale R/C cars. MRC's first entries in this new venture incorporated race-car-body designs like the Porsche 962C endurance racer and the Lancia LC2 Group C racer, but true performance car lovers haven't been forgotten. Enter the Tamtech Ferrari Testarossa. (For those of you who don't know, "Testarossa" is Italian for "Redhead.")

The MRC/Tamiya 1/24-scale, ready-to-assemble, electric-powered road-racing car kit puts you in control of one of the world's most renowned performance machines for about the price of the gas cap on the full-size Ferrari. The Tamiya kit



provides all the action and thrills of controlling this precision miniature R/C car either indoors or out.

The complete Tamtech kit tested in this report includes a 2-channel proportional radio-control unit, a 7.2V 270mAh Ni-Cd battery and a 4-hour charger. The kit

components include the Mabuchi FK-180SH mini-black motor, 3-point coil-spring suspension with both soft and normal front coils for fine-tuning according to track conditions, differential gearing utilizing four small bevel gears, four sizes of pinion gears for different running purposes, a set of pre-mounted sponge tires, a fully adjustable variable forward-and-reverse speed control and receiver unit (C.P.R.), a 2-piece polycarbonate chassis and the highly detailed injection-molded Ferrari Testarossa body. The only thing you'll have to provide are eight AA batteries for the radio transmitter and about one to one-and-a-half hour's worth of assembly work. As a matter of fact, before the Tamiya Ni-Cd battery is fully charged with the kit-provided charger, you'll be ready to run your car. By the way, MRC has an optional TamPack quick charger for those of you who are used to 15-minute quick charges. It's only a DC unit, but it will hasten those pit stops.

The Tamtech assembly manual is a 15-page, easy-to-follow pamphlet describing 24 start-to-finish steps to complete your car.



The 1/24-scale Tamtech kit comes as a complete package including electronic speed control, which is integrated with the receiver.



Don't rush through steps 2, 3 and 4, which explain the installation of the steering servo mounting and the C.P.R. (Control Processing Receiver). Space is limited and every wire has its place, so make sure that you take the time to fit all components neatly or the two-piece chassis will not assemble properly. The rest of the assembly is easy. I recommend the use of a pair of tweezers regardless of the size of your fingers; tweezers make working with the 1/24-scale hardware much less frustrating.

With the running chassis completed, all you have to do is place the body-mounting brackets

(Continued on page 110)

Twenty years ago 1/24-scale cars required slots for guidance; today, we use radios. Parma International, a leader back in the day of the slot car, still produces many 1/24-scale slot car bodies that can be fitted to today's radio-control counterparts.

Photos by Louis DeFrancesco, Jr. and Steve Pond

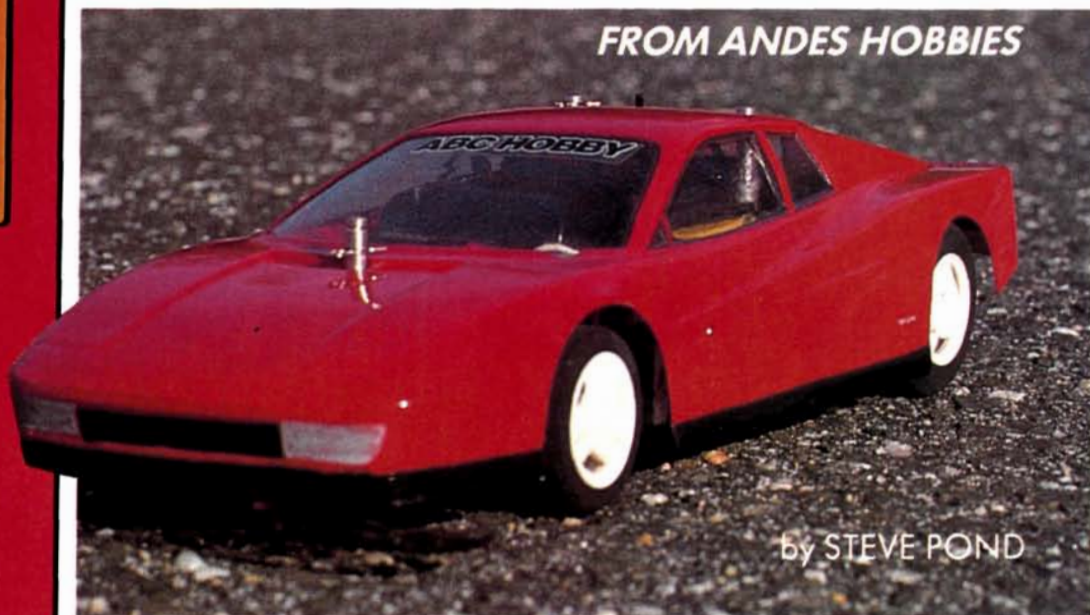


A B C

ONE TWENTY FOURTH

TESTAROSSA

FROM ANDES HOBBIES



by STEVE POND

"T" plate chassis, Lexan body and ball differential make this one the light-footed Ferrari.

Vehicle: ABC Testarossa
Scale: 1/24
Overall Length: 7 1/2 inches
Width: 3 1/4 inches
Height: 1 7/8 inches
Wheelbase: 3 7/8 inches to 4 9/16 inches
Front Track: 2 7/8 inches
Rear Track: 2 7/8 inches to 3 1/4 inches
Weight (w/battery): 8.9 ounces
Body Material: Polycarbonate
Chassis Type: Double-deck carbon fiber
Drive System: Spur gear w/ball differential
Suspension Type
(front): King pin w/coil spring
(rear): Rigid
Tires (front): Foam
(rear): Foam
Shocks: None
Motor: M&Y FK-180SH
Speed Controller: Electronic
Bearing Type: Oilite bronze bushing
Battery Type Required: 7.2V 270mAh 6-cell

IN WINTER'S FRIGID temperatures, R/C enthusiasts in the Northeast and Midwest looked indoors in an attempt to satisfy their seemingly insatiable need for speed. Indoor racing of 1/12-scale and 1/10-scale cars had limited success because of the amount of track space needed. The recent introduction of 1/24-scale cars has given hope to racers who haven't previously had enough space or cash for a sufficiently large track.

The 1/24-scale ABC Testarossa from Andes Hobbies* is the latest in a new line of

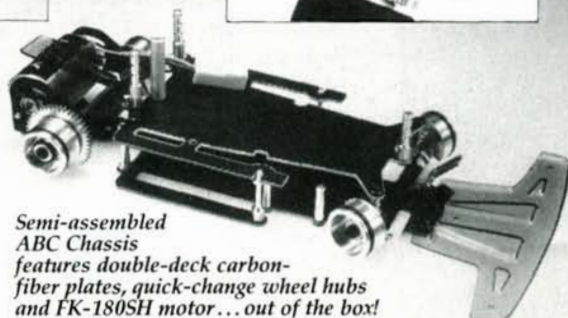
The radio for the ABC Ferrari features a pistol-grip SR2P transmitter and is supplied by Airtronics.



The adjustable wheelbase is for dialing in the handling and will come in handy mounting other bodies to this chassis.



The ABC Testarossa is available with radio (including integrated speed control/receiver) or without.



Semi-assembled ABC Chassis features double-deck carbon-fiber plates, quick-change wheel hubs and FK-180SH motor... out of the box!

pocket rockets that are invading the R/C car market.

THE KIT: The new ABC Testarossa has the same features that have been so successful in 1/12-scale racing. These include the carbon fiber T-plate chassis, independent coil-spring front suspension, adjustable ball differential, lightweight Lexan body and a quick-change wheel system which is unique to the ABC Testarossa. Each corner of the ABC chassis has aluminum hubs that are grooved for an O-ring, which the wheel snaps tightly over to hold into place. When your wheel is damaged, you simply move to the side of the track, pull off the damaged wheel and snap on a new one! The heavy-duty



The mini, adjustable ball differential gives the ABC Testarossa superior road-holding ability.

spur gear is made of aluminum and houses the steel balls for the differential. Another unique feature is an adjustment on the rear pod to lengthen or shorten the wheelbase. This is probably intended to accommodate the many different body styles that are available for this chassis, but it can still be used to your benefit. With a lengthened wheelbase, the steering becomes less sensitive and more controllable on a large track. If the wheelbase is shortened, the steering becomes more sensitive for better turning on tighter tracks.

If this isn't enough for you, the chassis of this high-tech mini-missile comes preassembled! Simply snap on the wheels, install the radio and you're ready to go! The radio system for the ABC Testarossa will be supplied separately by Airtronics*. It has an SR2P wheel-type transmitter. The radio system includes an integrated receiver, an electronic speed controller and a micro servo. The receiver/speed control

unit has a neutral adjustment, while the transmitter has throttle and steering trim adjustments. To power this whole system, a 7.2V 270mAh battery pack is required. For those of you who already have a Tamtech car but would like to switch to the ABC, the Tamtech radio system fits the chassis perfectly.

PERFORMANCE: Charging the 270mAh battery pack takes about three hours with a slow charger, but it's possible to charge these batteries with an adjustable-rate quick charger or peak charger. The battery is clamped into the chassis with sections of the upper chassis plate that are bent downward and held with two pins.

Testing was to take place at the site of the new BORRA (Bethel Off-Road Racing Association) 1/12-scale indoor track near Danbury, CT. The racing there is monitored with a computerized lap-counting system so, when we tested the ABC Testarossa, I had exact figures to chart its performance.

Although this was my first time with the ABC Testarossa, I'm no stranger to 1/24-scale racing. I've built and run many Tamtech cars, and I know how fast and sensitive these cars can be. The ABC car didn't let me down in the speed department, but it wasn't as sensitive as I'd anticipated.

These smaller cars with the shorter wheelbase are so sensitive that, traveling at speeds almost as fast as some slower 1/12-scale cars, a twitch in the finger can send your car into the wall or, at the very least, flip it over. Because of the superior suspension, the ABC car was controllable on the hairpins as well as when heading down the straights. At one point, the Testarossa began to roll a little more easily around left-hand turns, but inspection revealed that the battery had slipped from its hold-downs and so had shifted the weight to the right side of the chassis. To tighten the fit on the battery and hold it more securely, I wrapped some tape around both ends.

I was then confident enough to take the Testarossa onto the track for a few hot laps with the 1/12-scale cars. Some of the cars were pretty hard to keep up with, but the slower drivers and a tight

(Continued on page 76)



ROCKBUSTER R/C CARS



Original Version - 1/10 scale designed for the entry level driver. Features a RS-380 motor, rear differential, soft rubber tires, 3 speed forward/3 speed reverse speed controller. Requires a 2 channel radio, and a hump battery pack to run (not included).

KIT - 21331 85% Assembled - 21343
Optional Heavy Duty Suspension - 21713



Hopped-Up Version - Same basic design as Original Rockbuster but comes with a RS-540 motor, new suspension, bigger tires and hubs. Designed for competition.

KIT - 21772 85% Assembled - 21719

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ABC FERRARI

(Continued from page 71)

track presented a comfortable challenge. While I was in the middle of the 1/12-scale cars, my car handled just as well as they did, but then I found out why they don't run these two classes together. A slight error in judgment placed me in the path of a speeding 1/12-scale monster. As this other car closed in on mine, I closed my eyes to avoid seeing the collision. Needless to say, my car didn't win the confrontation and went sailing into the boards. Like a baby with flexible bones, the ABC Testarossa bounced right back. My champ was ready for more action! I'm pleased with the way the ABC 1/24-scale Testarossa performs; it's very lightweight, very fast and very controllable. These are great cars that can be easily run on a basement-size track. So, if winter chills and spring rain have you staying indoors, but you have a nice, clean basement, the ABC Testarossa may be just what you need! To see how the ABC car performs against the Tamtech, look for the shootout in this issue!

**The following are the addresses of the companies mentioned in this article:*

Andes Hobbies, P.O. Box 3077, Laguna Hills, CA 92654.

Airtronics Inc., 11 Autry, Irvine, CA 92718. ■

CLOD BUSTER

(Continued from page 15)

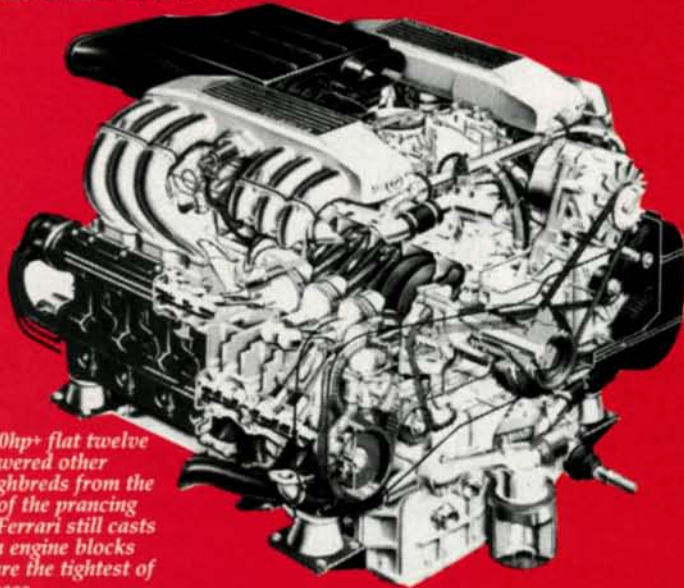
You should get a set of Aerotrend* bearings for your Clod Buster. I used them on my kit, and not only are things tighter and smoother right off the bench, but they don't wear out! The Aerotrend set replaces all but four of the kit's ball bearings with the finest stainless-steel ball bearings. Right after step 36 is completed for the second time, both gearboxes are attached to the chassis.

The last few steps cover the assembly of shock absorbers and attaching the tires to the wheels. The shocks on the Clod Buster are disappointing. Even on some of the spring-dampened shocks, there are O-rings to give the units some kind of dampening. The dampers included in this kit don't use anything to absorb the bumps or jolts and have only the springs to suspend the chassis. Even with a set of optional oil dampers, the instructions require that you install a 19mm section of rubber tubing on the piston of each shock. This will limit the suspension travel to about 1/2 inch.

(Continued on page 84)

FULL FERRARI

(Continued from page 72)



The 400hp+ flat twelve has powered other thoroughbreds from the stable of the prancing horse. Ferrari still casts its own engine blocks to ensure the tightest of tolerances.

many of its predecessors, including the venerable Berlinetta Boxer. It's the most powerful of the aspirated Ferrari engines and produces over 400hp.

Enough accolades for now. The story behind the Testarossa goes back 30 years to when long-distance races excelled even Formula 1 both as testing grounds for technical qualities and in visibility to the public. At that time, during the '50s and '60s, although Ferrari dominated Formula 1 racing, winning four world titles, its most outstanding successes were in the sports car category. The Ferraris used in these races had 2953cc V-12 engines which, in their original GT versions, produced 200hp. Research, continually updated by track performances, brought subsequent modifications leading to optimum performance in the 1957 model which achieved both success and renown in the 1958 season.

Experts and auto enthusiasts look back on these engines as masterpieces in the history of car racing. They coined the name "Testarossa" (Redhead) because the camshaft covers were painted red instead of the usual black. There followed a series of exciting and unforgettable victories: the 24 hours of LeMans, the 1,000 kilometer race in Buenos Aires, the Targa Florio and the 12-hour race at Sebring.

The Testarossa engine remained virtually unchanged for almost seven years—something very rare in car racing, especially when compared with today's racing, where the technology changes with almost every race!! This is a true testament to the design integrity of the engine, and it

changed only when Ferrari introduced the twin-camshaft design.

The glorious name and tradition live on in this latest Testarossa—and what a car it is! It's faster, larger and much smoother than the other Ferraris. What's most striking is the inherent smoothness. 160mph actually feels like cruising speed—it's extraordinary! The muscular, flat 12-cylinder engine sounds like a mellow Italian mezzo-soprano at the lower rpm, but when you let the hammer down it sounds like a drove of angry hornets. Throttle response is immediate and those huge, 12-inch vented brake rotors decelerate this thoroughbred like nothing you've ever imagined. When going into those tight chicanes, you enter with confidence. It's a big car and you feel as though you can do anything with it; but watch out, you can get in trouble really quickly with a powerful mid-engine car. They're extremely unforgiving.

I've driven many exotic cars, including the 12-cylinder 48-valve Lamborghini Countach, which, some claim, edges out the Testarossa in top speed. In my opinion, the Testarossa is a superior automobile in handling, braking and high-speed stability. Remember, the Testarossa is the result of over 40 years' development of racing technology and that most other manufacturers of exotic cars cannot make this claim. Let's just say that the Ferrari Testarossa is the ultimate automotive statement. And, speaking of automotive statements, what about that new 200mph-plus Ferrari which goes by the name of F40? ■

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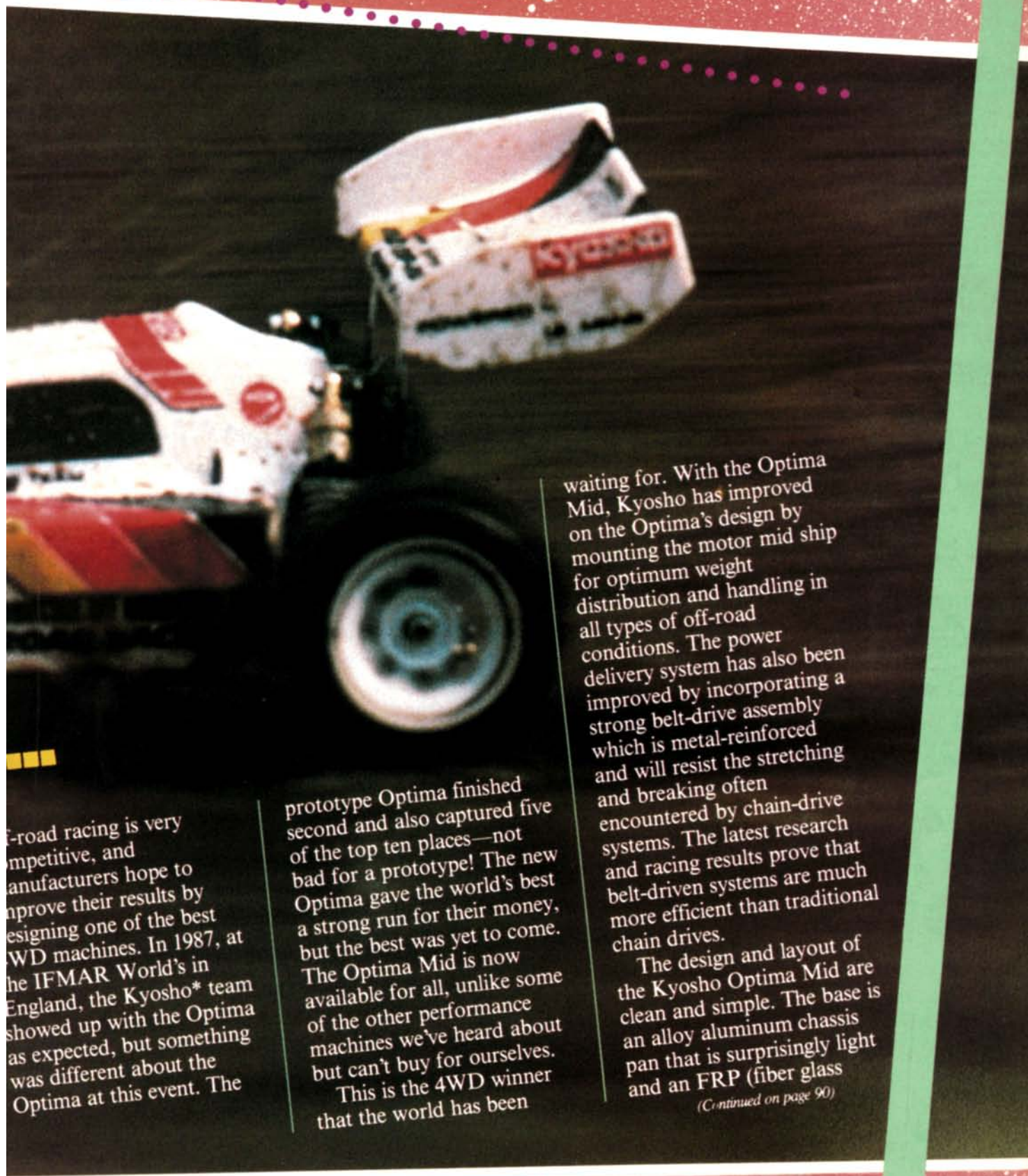


OPTIMA

MID

by T.J. LYN

FOR SOME TIME now, the Kyosho Optima has been proving that it's a world-class competitor. Four-wheel drive



off-road racing is very competitive, and manufacturers hope to improve their results by designing one of the best 4WD machines. In 1987, at the IFMAR World's in England, the Kyosho* team showed up with the Optima as expected, but something was different about the Optima at this event. The

prototype Optima finished second and also captured five of the top ten places—not bad for a prototype! The new Optima gave the world's best a strong run for their money, but the best was yet to come. The Optima Mid is now available for all, unlike some of the other performance machines we've heard about but can't buy for ourselves. This is the 4WD winner that the world has been

waiting for. With the Optima Mid, Kyosho has improved on the Optima's design by mounting the motor mid ship for optimum weight distribution and handling in all types of off-road conditions. The power delivery system has also been improved by incorporating a strong belt-drive assembly which is metal-reinforced and will resist the stretching and breaking often encountered by chain-drive systems. The latest research and racing results prove that belt-driven systems are much more efficient than traditional chain drives.

The design and layout of the Kyosho Optima Mid are clean and simple. The base is an alloy aluminum chassis pan that is surprisingly light and an FRP (fiber glass

(Continued on page 90)



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CLOD BUSTER

(Continued from page 76)

Upon further inspection, I found that this is to prevent the chassis from colliding with the gearboxes when the suspension is compressed. Therefore, I wouldn't recommend removing or even cutting down these spacers, as damage may result. The only way to get more suspension travel on the Clod Buster is by raising the chassis with longer shocks. After the tires are mounted, the chassis is complete. All that remains is the assembly and painting of the body. This is not a big deal unless you decide to go the route that I did!

I've always liked the detail that you get with an injection-molded body. Although these aren't the lightest bodies you can use, we're not exactly planning to enter the Clod Buster in the Off-Road Championships. Unlike Lexan or clear polycarbonate bodies, the injection-molded ABS body must be painted from the outside. I decided to give the Clod Buster a perfect lacquer job. In the past, many people have told me that lacquer couldn't be used on ABS or polystyrene because the thinner would dissolve, or at least etch, the plastic. But I'd set out to give this thing a great paint job, and I wasn't about to give up.

After getting some scrap ABS for experimenting on, I headed for the auto body supply shop and picked up a quart of PPG Spectra Red acrylic lacquer (used on 1981-84 Chevrolet trucks), some high-gloss thinner and some retarder. The high-gloss thinner takes longer to evaporate, thus allows the paint to flow before it dries to a gloss finish. Because it dries more slowly, the thinner has more time to attack the plastic. After some experimentation with different thinners, I found that it didn't matter how slowly the paint dried, because when I applied *light* coats it didn't damage the plastic. The retarder was used to further slow the drying process, and I obtained a high-gloss finish without buffing the paint. (Lacquer usually requires a great deal of buffing to achieve a high gloss.) For those of you wishing to try this yourself, I recommend using the high-gloss thinner with some retarder in the mixture to allow the paint to flow. If a retarder isn't used, you may end up with a rough finish that's hard to buff without damaging it. (If you're not familiar with this type of paint spraying, I'd stay away from it altogether.)

For more information on how to use lacquers on your ABS body, look for an article in a future issue of *RCCA*.

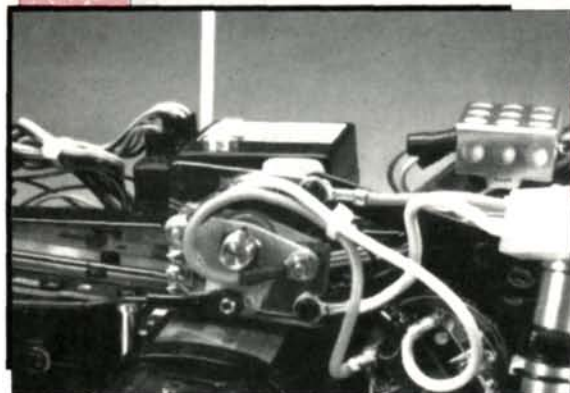
After 12 to 14 light coats of red lacquer, I gave the paint a quick rubbing

(Continued on page 87)

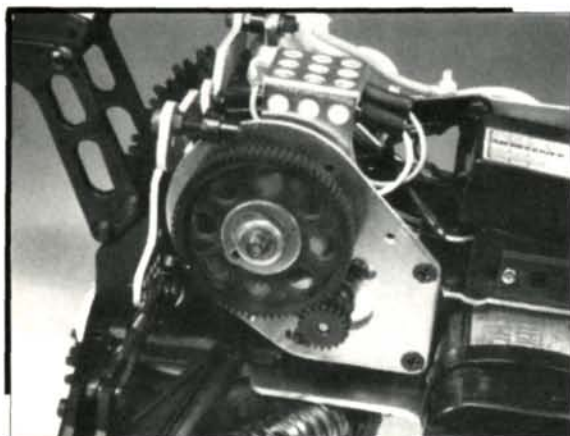
OPTIMA MID



Whether 2WD or 4WD, if you look at the winning cars of past and present, all have simple, uncluttered designs. The Optima Mid is a study in simplicity.



The contact plate and resistor-type speed controller is prone to problems if not kept clean. Parma or BoLink wiper-type unit would be preferable.



A pinion-and-spur gear is the extent of the gear system in the Optima Mid. Supremely simple...but oops!...there's that resistor unit again.

(Continued from page 79)

reinforced plate) upper chassis plate. With this combination, the Mid should be able to take on the very worst conditions and still emerge as a winner. The belt-drive system on the new Optima is fully enclosed with a Lexan shield. This increases the work if the belt needs to be checked. However, if, as the manufacturer contends, the belt doesn't stretch or break, then the enclosure is only going to prevent dust and dirt from getting into the system, and this will make maintenance a snap.

The suspension geometry of the Optima Mid is also different from that of the original design. New, special-formula, nylon suspension featuring extra-long, double wishbones for great wheel travel and ride were incorporated with a race-proven set of Kyosho gold shocks as standard equipment. The four differential bearings are standard. Optional equipment includes a set of low-profile, pin-spiked tires and wheels, a set of 48-pitch gears, the hot, LeMans 240ST motor, and a fully adjustable aerodynamic rear wing. All you have to add is your favorite 2-channel radio system and a battery pack and you'll be ready for the winning performances that many world-class competitors are going to experience with the Optima Mid in 1988.

The belt-drive assembly is very simple, and one of the most efficient power transfer systems ever seen in a mass-produced car. It's not only very efficient, but is also the least noisy 4WD as well. It really hums: the noise

(Continued on page 110)

CLOD BUSTER

(Continued from page 87)

Clod Buster did better. There isn't much (within reason) that will stop this truck. Obviously, you can't clear drivers' stands in a single bound or outrun speeding RC 10s but, as one TV car ad says, "If this isn't the ultimate vehicle, I think they've

invented the closest thing to it." Look for the Clod Buster in the "Monster Truck Shoot-Out" in the next issue of *Radio Control Car Action*!

*The following are the addresses of the companies mentioned in this article:

Tamiya Plastic Model Co., 2500 Woodbridge

Ave., Edison, NJ 08817.

Futaba Corp. of America, 555 W. Victoria St., Compton, CA 90220.

Aerotrend, 31 Nichols St., Ansonia, CT 06401. ■

PROJECT ULTIMA

(Continued from page 21)

is as follows: Up front is a set of stock Ultima tires and wheels, and the rear hugs the track with a set of Option House low-profile tires and wheels.

As for the electrics in the car, it's truly a case of mix and match, with a Novak mini-receiver, a Tekin* Pro 190 speed controller, a Futaba* S-32H servo to do the steering and a set of hot Trinity* matched Sanyos. All this mix-and-match equipment was powered by the now world-renowned Trinity Silver-Dot "Joel Johnson Signature" modified motor. The machine is topped with a Kyosho Optima Pro body, which will be available soon. For the Project car, I used a stock Optima body.

Of the three first finishers at the World's, Joel Johnson's Ultima looks least like the stock Ultima we're used to seeing. The Trinity chassis plate and shock towers give this car the look of a former championship car which many designs have been based on. With its wider stance and lower center of gravity, the Ultima is a true heavyweight contender. As far as weight is concerned, the Project Ultima weighs a mere 3 pounds, so it needs an additional 4 ounces to reach

(Continued on page 95)



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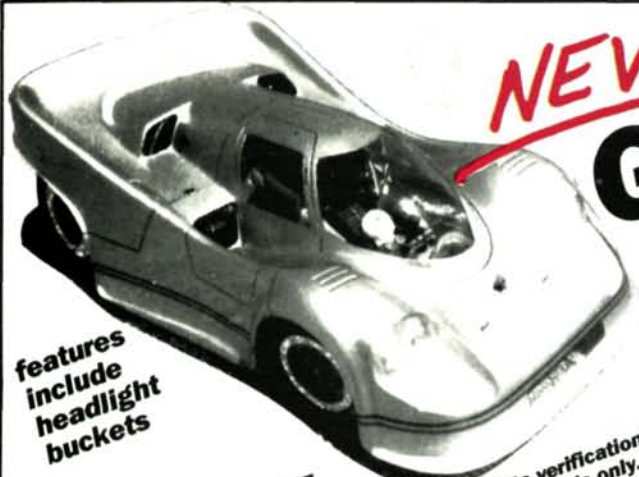
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92 RADIO CONTROL CAR ACTION

PROJECT ULTIMA

(Continued from page 92)

the legal limit covered by R.O.A.R. standards.

The performance of my Project Ultima was as impressive as the performance of Joel Johnson's Ultima. The powerful Trinity Signature motor combined with the low drag of the Ultima differential (a stock unit) provide all the performance anyone could handle. The only weak point with this setup was the over-steering, which was sufficient to make tight cornering a definite problem. After reviewing the photos of the champion's car, I decided that Joel might have once had the same problem, but had solved it by laying his car's batteries laterally on the chassis rather than horizontally, as I've done with Project Ultima. By switching the batteries to this new position and running them from front to rear on the chassis, more weight is distributed to the front wheels, and the over-steer problem is cured. To do this you'll have to make a slight modification to the rear bulkhead if you use anything other than a mini-servo up front. Just a small amount of trimming on the front side of the bulkhead will easily provide the necessary extra space for

your battery pack.

So the world champion's car isn't pure stock, but it's a very fine adaptation of the Kyosho Ultima. The only *major* change was the addition of the Trinity chassis plate. For the rest of the car I used a combination of stock and Option House components, so transforming the Ultima from the "Next World Champion" to the "Current World Champion."

**The following are the addresses of the manufacturers mentioned in this article:*

Kyosho and Option House distributed by: Great Planes Model Distribution, P.O. Box 4021, Champaign, IL 61820.

RC Performance, 18312 Gifford St., Fountain Valley, CA 92708.

Novak, 128 East Dyer, Santa Ana, CA 92707.

Airtronics Inc., 11 Autry, Irvine, CA 92718.

Twister, 371 Powell #B102, Azusa, CA 91702.

Tekin, 2411 S. El Camino Real, San Clemente, CA 92672.

Futaba Corp. of America, 555 W. Victoria St., Compton, CA 90220.

Trinity, 1901 E. Linden Ave. #20, Linden, NJ 07036.

When contacting an advertiser, please mention you saw his advertisement in

Radio Control Car Action

ULTIMA / RC 10

(Continued from page 25)

win the next two heats but gave the last one to the Ultima. We had each now exhausted seven battery packs, and the RC 10 had come out on top by a four-to-three margin.

Once again, all the battery packs were discharged with a 30-ohm resistor and allowed to cool for the next round. All the batteries were peak-charged at 4 amps, allowed to cool and topped off with a

(Continued on page 106)

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TESTAROSSA SHOOT-OUT

The two 1/24-scale redheads
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by RCCA STAFF



John Gallagher, one of the drivers in our shoot-out, is patiently awaiting the results from the computerized lap-counting system.



IN LATE MAY, 1987, the *Radio Control Car Action* staff took its first look at the Tamtech 1/24-scale radio-control car. It was the first of its kind in the States, and we considered it a revolutionary idea which would change the face of age-old slot-car tracks all over the country. Since then, a company called ABC Hobbies has also ventured into manufacturing these 1/24-scale mini-missiles and they're now available here from Andes Hobbies.* Since we have a Ferrari Testarossa feature in this issue of *Radio Control Car Action*, and both of the aforementioned companies manufacture chassis with the formidable Testarossa skin as covering, we decided to do a side-by-side comparison of these

two R/C rockets to see which is faster.

The MRC® Tamtech Testarossa features an A.B.S. monocoque chassis, rear stabilizer bar, independent coil-spring front suspension, planetary gear differential, FK-180SH motor, injection-molded body, plastic bushings and foam tires mounted on plastic wheels. The kit requires the 2-channel Tamtech radio system and 7.2V 270mAh battery pack. The kit is available with or without the radio system.

The ABC Hobbies Testarossa features a double-deck fiber glass chassis with T-plate rear suspension, independent coil-spring front

suspension, adjustable ball differential with aluminum spur gear, FK-180SH motor, quick-change wheel hubs, foam tires mounted on plastic wheels, bronze bushings and lightweight Lexan body. The kit is preassembled and requires a 2-channel Airtronics® system with integrated receiver/electronic speed control and micro servo. The kit requires a 7.2V 270mAh battery.

For our tests, we headed to the new BORRA (Bethel Off-Road Racing Association) 1/12-scale

indoor track in Bethel, CT. The track has a computerized timing system to eliminate any speculation about which was the faster car.

Once there, each battery was allowed sufficient time to charge to capacity with a trickle charger. Both cars were fitted with a 10-tooth pinion and then covered and readied for the big race.

The two drivers for the first round were Steve Pond of the *Car Action* staff and John Gallagher, president of the BORRA club and an accomplished 1/24-scale driver.

After checking out the track for a couple of laps, the two cars were lined up and waiting for the green. The ABC

car took the holeshot and went into the first turn in the lead with the Tamtech car close behind. Going into turn two, the ABC car widened its lead. Just before turn three, both cars, first the ABC and then the Tamtech, rolled over onto their roofs. Some good turn-marshalling straightened that out and the two started out again, a little closer than they were before the crash. Once again, the ABC Testarossa began to stretch its lead on the Tamtech as it came

(Continued on page 111)

ULTIMA / RC 10

(Continued from page 95)

5.5amp charge to ensure they were as close to peak as possible. We ran seven heats again with the RC 10 bringing

home the bacon in the first, third, fourth, fifth, and sixth heats and the Ultima taking the second and seventh. Obviously, the RC 10 was the winner in the Car

Action shoot-out but, before the letters start pouring in from concerned Ultima owners, there's something that must be said for both of these cars.

Having seen its success in the World Championship races, we know that a well-prepared Ultima is capable of beating an RC 10. Our results, and the track record of the RC 10 against the Ultima in many past big events, show that a well-prepared RC 10 can also beat the Ultima. These cars are two of the best 2WD cars available, and both have their strong and weak points. Many uncontrollable variables influence a car's performance, especially the performance of off-road cars. A bad line going through only one turn can cost you a couple of seconds and, ultimately, the race. So, it would be foolish for anyone to say that either car is the better one. The RC 10 has been atop the ivory pedestal many times, seemingly with no rival. Now it will have to share the spotlight with Kyosho's Ultima.

**The following are the addresses of the manufacturers mentioned in this article:*

Kyosho, Box 4021, Champaign, IL 61820.

Revtech R/C Products, 9525/B Cozycroft Ave., Chatsworth, CA 91311.

Tekin, 2411 El Camino Real, San Clemente, CA 92672.



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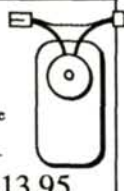
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MRC FERRARI

(Continued from page 69)

on the ABS injection-molded red Testarossa body, and all that stands between you and the finish line is your own driving ability.

The overall length of the Ferrari is 192mm, with a width of 84mm and a height of 49mm. Weight, ready-to-run, is

305 grams. Unfortunately, the car was too small for our radar gun to clock, so I can't provide you with any actual speeds, but the mini-block motor carries the Ferrari at speeds which would please any full-size car enthusiast.

The test runs on pavement were very enjoyable; this little performance machine

(Continued from page 69)

turned easily with virtually no drift at almost full throttle. Just make sure that the paved surface you run on is clean, because ground clearance is limited. Throttle response at all levels was precise and quick at distances up to 200 feet. I'm sure that 200 feet isn't the limit and that running the Tamtech on an outdoor track will be no problem. On a carpeted, indoor surface the Ferrari was even more "sure-footed" than on a paved surface, but oversteer potential is greatly increased when running indoors. The car's size and speed, along with very responsive steering, can get you into trouble quickly, so practice is the key to success. Take it slowly, keep control, and your speed and handling ability will naturally increase.

One-twenty-fourth-scale racing hasn't yet seen its best day, as it's relatively new to the R/C scene. I'm sure that since many parts of the country have limited outdoor racing seasons because of adverse weather conditions, this scale of racing will gain in popularity. Many of the densely populated areas around the country have limited space for racing, so perhaps now that 1/24-scale cars are available, the spaces once used for slot car tracks can be utilized for R/C racing as well. How about table-top racing? Why not? The Tamtech Ferrari is small enough for a tabletop or a small carpet track, so the sky's the limit with R/C racing! The fun and the excitement are endless regardless of scale.

*The following is the address of the manufacturer mentioned in this article:

MRC/Tamiya, 2500 Woodbridge Ave., Edison, NJ 08817.



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OPTIMA

(Continued from page 90)

here is from the motor and is unlike the cacophony produced by a drivetrain in chain systems. With the large-tooth, reinforced belt, the transfer of power from the midship-mounted LeMans power plant is sure and quick.

Like the Optima and Turbo Optima, space for electrics on board is tight, but very well utilized to provide the best possible weight distribution. Both steering and speed control servos are laid on their sides under the upper chassis plate, and each has its own mounting posts, so there are no double-sided tape or tie-wraps to deal with. The servos are held securely in place, and even the hardest impact will have a hard time loosening them. As for the speed control itself, the Optima Mid uses the same standard Kyosho plate-

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controller design as the other high-performance Kyosho cars. The major drawback to the controller in the Optima Mid is that if the wiper contacts lift off the base plate, the arcing which occurs will damage the controller permanently.

The speed control is mounted vertically instead of horizontally on the left side of the car just in front of the motor. The controller is only protected by the body and, apart from that, it's a moving target for a broad-side collision such as we've all encountered in both racing and non-racing conditions. I know that performance won't be hindered by the speed controller's current position, but I *am* worried about the possibility of severe damage should that collision become a reality. Before I race my Optima Mid, the speed controller will have to go, and an electronic unit will find its home on board this winning performer.

The only other vulnerable area in the Optima Mid is the front suspension, and this is not a problem with its design but with its comparative lack of protection. The kit comes with a small piece of nylon composite that will act as a bumper if impact comes directly from in front but, if the impact area is on one corner of the front suspension, I don't feel confident that the suspension will escape unscratched. This situation can be easily remedied by adding one of the many available wide-front bumpers. Just buy one that you can drill your own mounting holes in. I'm sure the engineers at Kyosho didn't feel that a wide bumper was necessary for a number of reasons but, if the drivers you race against are anything like some of the drivers I've encountered, you'll need a wide bumper to increase your chances of survival!

Once out of the shop and on the track, the Optima Mid makes the long wait for surefooted, quiet performance well worthwhile. Acceleration coming out of the turns is a real experience in off-road driving. The LeMans 240ST provides the Mid with a strong 4-minute run. With improved weight distribution, the Optima Mid is much more capable of taking on jumps and then getting back on all fours with ease. The quiet performance of the drive train is deceiving. You don't hear the same loud noise as is produced by traditional 4WD systems, so you really don't think that the car is at top speed when, in fact, it is. Then, suddenly, you're on a corner and you have to back off the throttle to reduce your speed.

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**The following is the address of the manufacturer featured in this article:*

Kyosho, Box 4021, Champaign, IL 61820.

1/24 SHOOT-OUT

(Continued from page 105)

around turn four and headed for home. At this point, it was becoming more and

more obvious which was going to be the winner. As the race went on, the ABC car began to pull away, consistently running laps 2 seconds faster than the Tamtech on 10- to 15-second laps! The fastest lap turned by the ABC car was 9.9 seconds, while the Tamtech's best time was 10.6 seconds. After 15 laps, the ABC car had put the Tamtech down by two full laps.

Then it was time for the ever-important drag race. Both batteries were given a peak charge at the rate of one amp until

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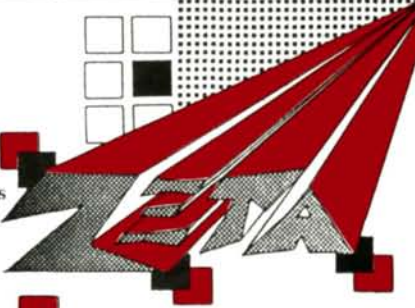


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1/24 SHOOT-OUT

they were to capacity. A 55-foot section (a 1/24-scale 1/4-mile) was marked out for the two cars to run. The first run resulted in a photo finish, with both cars running a 2.48 with a 14.51mph average. For the second run, the differential on the ABC car was loosened up to improve traction. The result was a clear ABC victory in a time of 2.30 seconds with an average speed of 15.65mph. The ABC also took the third run with a time of 2.12 seconds and an average speed of 16.98mph, which proved to be the best run of the day. Taking reaction time and acceleration into account, with average speeds like these it's likely that these cars have a top speed of over 20mph! Not too bad for cars with tires less than one inch in diameter! Seven more drags were run, and the ABC car beat the Tamtech by a

good three feet each time. The ABC Testarossa scored a decisive victory over the Tamtech once again.

Another road course was set up and the drivers swapped cars to double-check our first-heat results. Could the results have been due to one driver being better than the other? The results were the same. The ABC Testarossa was clearly the faster of the two, but the Tamtech is definitely more durable. This superior durability unfortunately means excess weight, and this was one of the major causes of the Tamtech's defeat; the other being the fact that the chassis isn't adjustable. The adjustable toe-in and the adjustable ball differential alone would have given the ABC car the edge, not to mention its lightweight chassis.

To sum up: The Tamtech car is exceptionally durable, and this is a priority for

some but, for those who fancy the lightness and speed of our victor, it's as simple as ABC!

**The following are the addresses of the companies mentioned in this article:*

Andes Hobbies, P.O. Box 3077, Laguna Hills, CA 92654.

MRC Tamiya, 2500 Woodbridge Ave., Edison, NJ 08817.

Airtronics Inc., 11 Autry, Irvine, CA 92718. ■

ROBBE FERRARI

(Continued from page 66)

not meant to be performance vehicles, it's nice to have a great-looking car that performs as well. With the Testarossa, you have the best of both worlds.

The chassis is suspended by upper and lower A-arms, and six pre-filled, oil-dampened shocks; four for the rear and two for the front. Power is transmitted from the mid-ship motor to a ring-and-pinion gear that surrounds the spider gears. The differential, like all other friction points on the chassis, is smoothed out by a full set of ball bearings.

To power the Testarossa, Robbe offers two different drive systems for different types of car performances. The M-drive set includes a standard Mabuchi 540-type motor and a three-step forward-and-reverse speed control. The E-drive set includes an electronic speed controller with proportional forward-and-reverse as well as a Robbe LeMans 480S motor. I highly recommend the E-drive set. Since the Testarossa is no slouch, the R/C version shouldn't be either.

Another option I used on the Robbe Testarossa was the lighting set. This set includes bulbs for flashers, brake lights and main headlights. With a 4-channel radio system, the headlights and turn signals can be remotely operated. This may sound like just another gadget, but it's really something to see when it's fully operational. The radio system used is the Conquest 4-channel/3-servo system on a surface frequency.

CONSTRUCTION: The instructions for making the Testarossa are printed in six languages including English, so I think it's safe to say that you shouldn't have a problem following them. A large sheet of diagrams accompanies the instruction manual for both the chassis and the body assembly.

The assembly begins with the front and rear assemblies and assembly of the suspension arms. Included in the package is an addition to the instruction manual concerning the rear suspension. The additional instruction suggests swapping the left and right axle blocks to move the rear

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wheels forward in the wheel well. I didn't pick up on this, and ended up taking it all apart to change it later. The moral of the story is that you should always check out the whole kit before starting to assemble the car.

Next, the radio system is installed into the lower half of the chassis. Once this is complete, the front and rear assemblies are attached. This is capped off with the top half of the chassis.

Once the chassis is complete, the assembly procedure moves on to the body. To assemble the body, you have to refer to a second set of instructions if you want to install the lighting system. To my surprise, the instructions for the lighting system assembly were in German! I'm sure that if you spent a little time on it you could figure out how the system works, but I would much rather have had the English instructions. The people at Robbe assured me that all the instructions for the system will be in English by the time you read this.

Body assembly goes relatively smoothly, with the exception of the operational headlights. Installing these involves gluing the headlights to the body, gluing parts to the headlights and gluing a thin rod between the two lights to allow their operation. The rod connecting the two headlights provides no means of connecting them to the light assemblies, unless you use glue and accept a tight fit. If you've ever tried to glue anything to a piece of metal rod, you'll know how futile this effort is. This is the one area where there's room for improvement.

One other tip that you might find helpful when installing the lighting system is that you should move the circuit board

forward to just behind the rear window. In its original position, the circuit board will hit the shock mounts. From here on, installing the lighting system should be hassle-free.

Now all that remains is to show off your brand-new Testarossa. (OK, it's not the full size, but you can pretend!)

PERFORMANCE: When I took the Testarossa out for its maiden run, I didn't have high expectations of its performance. The car is rather heavy and it sports not-so-sticky-looking rubber tires. Not quite what I'm used to looking at on the carpet

tracks!

The Robbe electronic speed control starts off with a whine as you hear the current pulsing to the motor. The radio setup really confused me, because the throttle and the steering are on the same stick, while the stick that normally operates the throttle is occupied with the headlights and turn-signals. After getting the feel of this new driving style, I kept running a large figure eight, slowly increasing the speed with each lap to see what this baby could take. Only when the car reached top speed did the tires start to

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ROBBE FERRARI

break loose, and even then it was a controlled slide with no understeer or oversteer. (They must have had Goodyear in on this one!)

Although this car is no candidate for the Car Action/Locrite Invitational, it does perform much better than I expected.

However, that's not its greatest feature. I think I had more *fun* running the Testarossa than running any other car. I'll never forget the look on the faces of our friends at the Ferrari dealership as they watched the car and the headlights popped up! To date, the Testarossa is still a crowd pleaser with its elaborate lighting and beautiful scale detail. For the time being,

our publisher is the only person I know who owns a full-scale Testarossa, but I'm happy with the next-best thing until mine is delivered... HA, HA!

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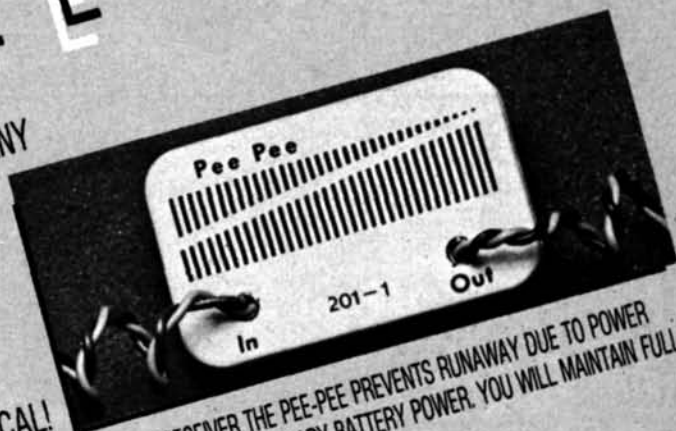
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NI-CDs

(Continued from page 122)

good way of conditioning your pack, because it will balance each cell as the pack discharges down to this target voltage. Any other method of discharging a pack, which would bring a cell below 1V, isn't recommended.

Never let the two lead wires of the pack come in contact with each other, as this will cause a direct short and it will damage the pack.

Charging Ni-Cd Batteries: You mustn't let your battery get hot; heat is a battery's

worst enemy. If you remove a hot battery from your car, let it cool to *body* temperature before recharging it. You may even put the battery in the refrigerator for 30 to 60 minutes. Recharging a hot battery can damage it.

A cool or warm discharged pack is now ready for charging to replace the electrical energy used up. All batteries have a capacity rating. Most sub-C Ni-Cds are 1,200 milliamps per hour, which can also be stated as 1.2 amp hours. Not all of this capacity is available. The pack

will only provide about 1 amp hour of usable power. Charging this battery will replace 1 amp hour of electrical energy.

There are two basic methods of Ni-Cd charging. First, slow charging. If a charger is only capable of putting out 50 to 150 milliamps, it's a slow charger. This method usually takes overnight to fully charge a 6-cell pack. Although this may be inconvenient, it's an excellent method of charging. Slow charging once a week will help condition your Ni-Cds, because this method allows *all* the cells in the pack to reach the same level of charge without the concern for overcharging or overheating.

The second method is fast or quick charging. This method uses a charge current of 3 to 5 amps. This is the most popular method used, because quick-charging only takes about 15 minutes. Batteries must be designed and manufactured to handle the higher charge currents used in quick charging. If your pack is labeled "Not for quick-charging," don't attempt to quick-charge it. These batteries may be damaged by quick-charging, and they might also explode. Some of the Ni-Cds sold in toy stores are of this type.

When you charge a pack, you're really charging each individual cell. When a cell reaches full charge, and you continue to fast-charge, the incoming electrical energy is converted into heat. Heat causes expansion, and this can force the electrolyte to vent or leak out. Once a cell has vented, it won't be capable of providing its original power and is permanently damaged. This electrolyte, usually potassium hydroxide, can cause a severe burn. Be careful not to overcharge your battery but, if you do, look for signs of venting *before* touching the pack. The plastic wrapping on the pack may blister or develop holes because of the heat. Other signs are dark-colored spots at the top (+)

(Continued on page 120)

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CLOD BUSTER

(Continued from page 84)

with some Liquid Ebony, which is used by car care experts to take small scratches out of the paint. I used some of the decals supplied with the kit, but I couldn't bring myself to cover the superb lacquer job with too many decals. Once this stage is complete, there's one more step — some serious stompin'!

PERFORMANCE: Even with its incredible size and two motors, the Clod Buster still uses a 7.2V 1,200mAh battery pack. When in the "economy" mode, the run time will be from five to eight minutes. When in the "power" mode, the time is reduced to three to five minutes.

In search of longer run times, I spoke to Aerotrend's Bill French, who provided me with the biggest battery pack I've ever seen! The battery is a 6-cell pack using Sanyo D-cell rechargeables with a capacity of 4,000mAh! The pack is broken up into two 3-cell packs and placed at the front and rear of the chassis. With the Aerotrend battery, the running times were over half an hour! The batteries take at least 45 minutes to charge, but think of all the stomp-in' you can do. After giving the batteries a good charge, it was time to head for the beach for some 4x4x4 fun!

The tires on the Clod Buster can be used on virtually any terrain, and the sand was no exception. On occasion, I've taken cars to the beach to put them through their paces, but sand tends to swallow the tires and immobilize a car. Not the Clod Buster! The tires are so wide that they don't sink into the sand but seem to float across. With the switch in the "power" position, the Clod Buster has very good acceleration, and its top speed is really amazing. It's not as fast as some of the smaller 2WD trucks, but its speed is double that of any comparably sized truck. This is probably because it has dual motors.

Another positive attribute of the dual motors is the advantage they give the Clod Buster when it's climbing. If the rear wheels dig in and get stuck, the front end has its own motor to keep pulling and, nine times out of ten, the Clod Buster will pull itself out of an almost insurmountable hole. After clearing every obstacle on the beach, I tried to do some stunts. Still in the "power" position, I ran the Clod Buster at full speed in reverse and jammed the throttle into forward. The Clod Buster kicked back on its rears and rode the bumper for about five feet! The same was

true when the operation was performed going in reverse.

For the hell of it, I decided to try it with the switch in the "economy" position. With the switch in this position, running time is twice as long, but the power is halved. The "economy" position is good for those who want to save their batteries, but when you're using a 4,000mAh battery, this is *not* a consideration! Back to the "power" position!

Before I'd really finished, night fell and I had to pack it in for the day to go home, recharge and wait for dawn and more obstacles. To my surprise, I woke to find eight inches of fresh snow! For a fleeting moment, I gave in to the bad weather and considered finishing my torture test on another day. Then inspiration struck! Would snow stop the Clod Buster? In a flash, I was out of bed and on my way.

I wouldn't try this with a 1/10-scale car even in only 1/2 inch of snow, but I put the Clod Buster on the cleaned pavement and went hell-bent towards the snow! The Clod Buster made it about 12 feet and then sank slowly. I'd at last found an obstacle that the Clod Buster couldn't handle! After I adjusted to the snow, the

(Continued on page 92)

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NI-CDs

(Continued from page 116)

end of the cell, or corrosion (green color) at the cell connections. You may even notice powder or crystals. Don't buy a used battery pack with these problems.

TRICKLE CHARGERS: A trickle charger is a slow charger that delivers about 100 milliamps of current into the battery. At this rate the battery would be charged in 10 hours (10 hours $\times$ 100 milliamps =

1,000 milliamps, or one amp). However, during charging, as the battery becomes charged it will accept less and less current, so it may take 14 to 16 hours to charge a battery with a trickle charger. Most quick chargers trickle-charge when they are connected to the source input and the timer switch is in the "off" position.

QUICK CHARGERS: Charge cables connect directly to an automobile's 12V electrical system. They aren't just two pieces of wire. The length and type of wire used are designed to be of a predetermined, measured resistance. The resistance they provide ensures that a safe amount of current will be transferred to the battery pack.

Charge cables (sometimes referred to as "suicide cables") are difficult to use, because you must keep track of the charge time yourself. Many battery packs have been ruined by charge cables overcharging. If you wish to use them, be sure the cable is the right one for your size pack, carefully watch the clock and monitor the battery's temperature. Batteries warm up as they become fully charged.

• Many quick chargers are advertised as automatic chargers, but they aren't really automatic. They are manual, 15-minute timer switches that turn off automatically. You are responsible for learning how to use the charger and ensuring that your pack is not over-charged. The charger doesn't know if it's over-charging your battery; it simply charges for the length of time you dial in on the 15-minute timer and then shuts off. If your battery was

(Continued on page 124)

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BATTERY CHARGING

by KEN FRITZ



Get The Low-Down On High-Voltage

This 8.4V and 7.2V flat pack is composed of sub-C Ni-Cd cells.

STATE OF THE ART technology is incorporated into our R/C cars, boats and planes. Your enjoyment of the hobby will be greatly increased if you understand the basic rules. As owner of the Pit-Stop*, I realize the need for all R/Cers to know as much as possible about batteries.

Using and charging Ni-Cd Batteries: Ni-Cd batteries are used in the hobby industry to power electric motors in cars and airplanes, and also to power radio transmitters and receivers. Unlike dry cells, which are discarded after their charge has been used up, Ni-Cds are rechargeable. Ni-Cds are made of nickel cadmium and contain a liquid electrolyte that stores and gives up electrons. With proper care, they can be recharged and reused hundreds of times.

Ni-Cd batteries are manufactured in all standard sizes. The most commonly used size for hobby cars is the sub-C, which is slightly smaller than the standard flashlight C-size battery. Each sub-C cell has a 1.2V rating. Cells are connected in series to form a battery pack. A 6-cell pack is 7.2V and a 7-cell pack is 8.4V. Six-cell flat packs are most commonly used. Some cars require a "humpback" style, which positions one or more cells on top of the others.

In most battery packs, each individual cell is charging and discharging at its own



Left: A DC charger, such as this Hobbico Multi-Charger, uses an automobile's 12V electrical system as input. This one plugs into a cigarette lighter socket.



Below: This Tekin peak-sensing charger monitors the charging pack's voltage and automatically shuts off when full charge is reached.

rate, and the best packs have matched cells. Cells that charge and discharge at the same rate are selected from a large number of cells tested, to make up a matched-cell pack. Only a small percentage of batteries is used for matched packs. They are a good investment, because they provide slightly more power and usually have a longer life.

Ni-Cd batteries have memories and will adjust to their owner's habits of charging and discharging. This is an advantage if you understand how to use and charge Ni-Cds, but is a disadvantage if you don't properly charge and discharge them. If you only used half the charge each time



A slow charger, such as this World Engines unit, is periodically used to condition your batteries and will also give your pack maximum charge without danger of overheating.

harder. Electrical problems, like loose or dirty connections, waste power. Motors themselves, if allowed to get too hot, may be damaged and use more current. All of these factors may reduce your run time.

It's normal for the pack to get warm during normal use in the car. Hopped-up motors will cause the pack to get very warm. If the pack is hot to touch after a 15-minute run, this probably indicates a problem with the car.

Get in the habit of running the car until you notice a loss in power. Store the battery in this discharged state and then recharge it before using it again.

If you're not sure about your battery's charge, there are two alternatives. The best thing to do is to put the battery back in the car and run it, and again watch for the loss in power. However, if your car is equipped with a BEC (battery eliminator circuit), then this may not be a good idea because, if your battery is already discharged, you may lose control of the car. A BEC powers the radio equipment in the car by taking power from the main car battery pack. It shares the battery so, when the battery is low, there may not be enough power to operate both the car and the radio. In this case, follow the other guidelines mentioned in the "charging" section.

An ideal voltage for a battery to be discharged to

is between 6V and 6½V. This is about 1V per cell. A 30-ohm discharge resistor may be plugged into your already-discharged battery pack and, overnight, it will safely bring your pack down to this voltage. This is a
(Continued on page 116)

you used the battery, the battery would soon be capable of delivering only that amount of power. Improper use will shorten the lifespan of the pack and reduce the usable power output of the pack during normal use. Improper use may also destroy the battery pack and may even damage the car it powers.



These Sanyo SCR quick-charge cells are designed for the high amperage put out by most fast chargers.

Using and Discharging Ni-Cd Batteries: Proper charging and discharging of the Ni-Cd pack is very important. When you notice that your car has lost full speed, your battery is discharged. Your motor may still run, because some cells aren't completely discharged, but continuing to run the motor may damage the weaker cells. Don't hold your car by the bumper and let it run until the motor stops, as this is bad for your Ni-Cds. As a rule, when your motor runs at half speed you have a discharged battery and it's time to recharge.

If your car has a 6-cell Ni-Cd pack and a (smaller) .380-type motor, half speed will occur after 20 to 25 minutes of continuous use. A stock .540-type motor will consume the fully charged 6-cell pack in 12 to 15 minutes. Hopped-up motors may be designed for a specific type of race, and these use up the battery in 8, or even 4 minutes.

Other factors may reduce your run time. Mechanical problems, like bent shafts, slipping axles or wheels rubbing on suspension parts, cause the motor to work



Use of discharge resistors is recommended to wipe out the "memory" of your Ni-Cd battery packs.

NI-CDs

(Continued from page 120)

discharged when you started charging, 15 minutes will take it to full charge. If your pack was not fully discharged, then 15 minutes of quick charging will overcharge and could even damage the pack, even though you're using an automatic

charger.

If you're sure your battery is fully discharged, then you can set the timer to 15 minutes and let it go. However, if you aren't sure if the battery is fully discharged, you must monitor the battery's temperature. Be ready to stop charging as soon as

the battery gets warm. When in doubt, pick up the battery every minute to feel it. *Don't let it get hot.*

Most quick chargers have an ammeter to indicate how many amps are going into the battery. When you start a quick charge, the ammeter should show about 5 amps. After three or four minutes of charging, it should read slightly less—about 4 to 4½ amps. Near the end of the 15 minutes, it may read between 2 or 3 amps. All meters vary in accuracy. Your charger might be still working well even though you don't have exactly these readings. If you're concerned, take your charger to the hobby shop for checking. Remember that 15 minutes is enough, but stop earlier if your pack gets warm.

If the ammeter reads 5 amps after 10 minutes of charging, there's a problem with the pack or the connector. The pack shouldn't be able to accept this much current after 10 minutes of quick charging.

If the ammeter reads 3 amps after about 2 or 3 minutes of quick charging, it means that the battery is already almost fully charged and doesn't need the full 15 minutes. If this happens, monitor the battery's temperature at one-minute intervals and be ready to stop charging.

Not all quick chargers have an ammeter. If you're planning to buy a quick

(Continued on page 127)

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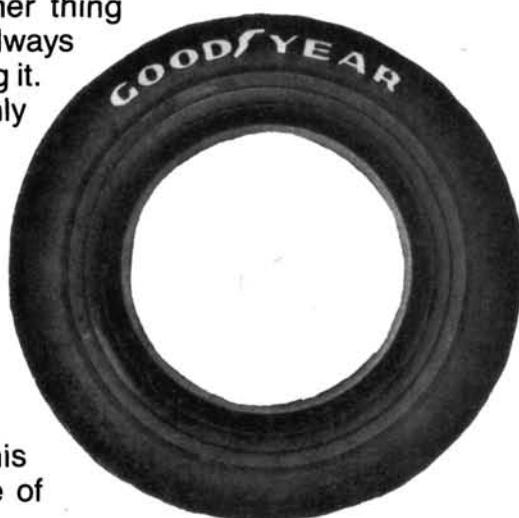
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NI-CDs

(Continued from page 124)

charger without a meter, please understand and follow the rules for quick charging, and be ready to spend more time monitoring the battery's temperature.

- Batteries provide direct current (DC). A DC charger is designed to be connected to an automobile's 12V electrical system. Connect your charger to the car's battery under the hood, or use the cigarette lighter socket, usually with the ignition switch turned on. These chargers may be used when you're at the park, campground, race track, etc. DC chargers are *not* recommended for use by children.

- The most popular type of quick charger is the AC/DC type. Alternating current (AC) is the type of electricity you have at home. These chargers plug directly into a house wall socket and also connect to a 12V DC source. They are the most convenient to use and may be safely used by children.

Some AC/DC chargers have an input selector switch. Look at the switch and set it to AC or DC before you begin charging.

Most quick chargers are protected by a fuse. This means that when something is wrong, and the charger is putting out too much current, the fuse will "blow" or

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NI-CDs

burn out. It's designed to do this to protect the charger. Always replace the fuse with a new one of the same amp rating. If you replace the fuse with one of a higher rating, you may damage the charger. If the recommended fuse keeps burning out, try to figure out why, and then attempt to correct the situation.

Periodically, you should feel the connector joining the battery to the charger. Electrical connections shouldn't get warm. If they do, it means that there's something wrong; the flow of electricity is being restricted. The problem could be caused by loose or worn pins, broken wires, dirt or bad solder joints. This is a potential problem with all wiring in your car and your plane too. Check to make

sure that all connections are clean, tight and insulated. Wire insulation prevents wires from shorting when they touch.

It's normal for internal parts of a quick charger to get hot during use. The metal faceplate of the charger is a heat sink; it draws the heat out of the charger. It's normal for this front plate to get hot. You'll soon learn to touch *only* the knobs on the charger and *not* the metal faceplate.

- Some chargers have a 6- to 7-cell switch and are capable of two different output currents. You can charge a 6-cell battery in 15 minutes using the 6 position, or charge a 7-cell battery in 15 minutes using the 7 position. Don't attempt to charge a 6-cell battery in less than 15 minutes using the 7 position. This will deliver more current than the 6-cell bat-

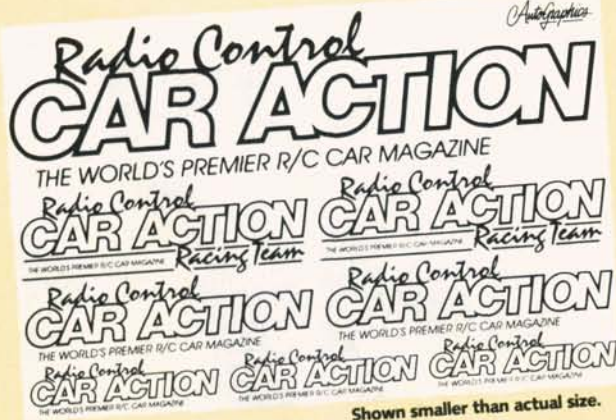
tery should receive, and it will overheat and damage the pack. Seven-cell batteries can be charged on six-cell chargers by giving the pack a total charge time of 20 minutes.

- Quick charges may have "variable current" or "current adjust." This means that they have a control that allows you to dial in the amount of current delivered to the battery pack. You can charge different-size packs, and even different-size cells, by controlling the current. Charger instructions will tell you what the rate should be for each type of battery, based on their amp hour rating. Initially, turn on the 15-minute timer with the current-control knob in the low position. As soon as charging begins, adjust the level up to the specified current. Set the control to 4½ amps for 6-cell 1,200-milliamp packs.

Current-adjustable chargers may be used for other purposes. You can power your motor using the charger, in or out of the car, to determine its current draw. It may be used to break in a new motor, but don't attempt to run it at less than 6V as this will overheat the charger. Some experts feel that a lower voltage is better for motor break-in, but you could ask the people at your hobby shop.

- Some quick chargers have a discharge switch. Remember that it's better for the battery to go from fully discharged to fully charged. This switch allows the user to ensure that the pack is fully discharged before recharging. The theory behind this switch is sound. If you aren't sure of the charge in your battery, then you could do a discharge test with this feature. With proper use, the charger can discharge your battery before you begin charging. The switch also provides a method of conducting a total battery output test to determine the condition of your battery pack.

(Continued on page 130)



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NI-CDs

(Continued from page 128)

The discharge switch is useful in the hands of a knowledgeable user. However, having this switch on the charger places a

responsibility on the user to learn how to use it, and to be constantly aware of its position whenever the charger is in use. Children and careless users have some-

times destroyed their packs by leaving this switch in the "discharge" position, putting the timer on for 15 minutes, and then leaving the charger unattended.

PEAK CHARGERS: The latest advancement in battery-charging technology is the introduction of peak chargers. With all of the aforementioned quick chargers, the user was responsible for charging the pack correctly. The peak charger is different, because it can determine when the battery is fully charged and then automatically shut itself off. You no longer need to worry about over charging, over heating or under charging your battery. These are the only truly automatic chargers.

● One method of detecting that a pack has reached full charge is to note the rise in temperature. These chargers have a probe attached to the battery, and this will sense the rise in temperature. When the temperature rises, the charger will stop automatically.

Temperature-sensing peak chargers are the least expensive type of peak charger. They work well, but only when the user follows the manufacturer's instructions. The probe must be properly at



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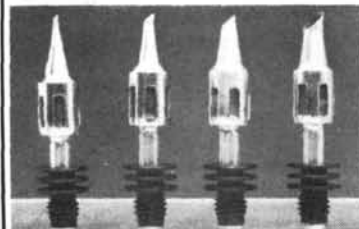
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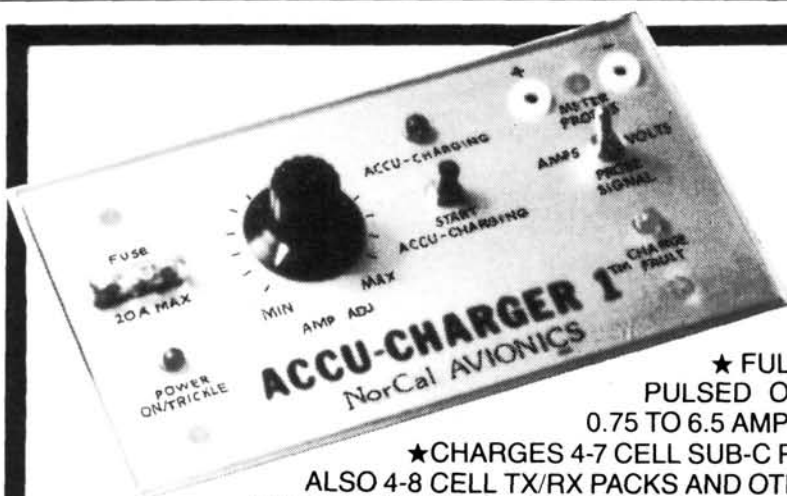
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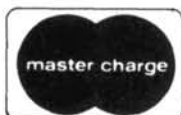
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tached to the pack if it is to work effectively.

• When a battery is being charged, its voltage increases, and there's a point at which the charging pack will have reached maximum voltage. When the pack is fully charged, voltage begins to drop and, at the same time, temperature

begins to rise. The voltage-sensing peak charger will notice this drop in voltage and shut off. This is an excellent method of battery charging because, not only is the battery fully charged, but it's *peak*-charged each time. Peak means that the charge is the maximum possible, and the battery will provide its maximum power.

These chargers are excellent, but they unfortunately cost about three times more than a good-quality AC/DC quick charger.

Most hobbyists who race their cars soon learn the importance of good batteries. Many races are won by cars with matched-cell packs that were *peak*-

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NI-CDs

charged.

Many quick chargers have voltmeter taps. These are outlets in the charger by which a voltmeter may be attached. An analog-type meter (needle type) will indicate the voltage in the pack which relates directly to the level of charge in

the pack. A 7.2V pack, will register more than 8V when fully charged and as much as 10V while being charged.

If you wish to peak-charge your packs, the analog voltmeter won't be of use to you. In order to peak-charge a battery pack, you must stop charging when the voltage drops three-hundredths of a volt, and this is possible only with a digital

voltmeter. Digital voltmeters have many uses for the serious hobbyist. Let your local hobby shop explain the other useful electrical tests it can perform, which will help you troubleshoot your electrical problems.

Ni-Cd batteries and chargers will give you many years of trouble-free service if you follow these simple guidelines:

(Continued on page 134)



TWISTER NEWS

JAN. 15 1988
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NI-CDs

- Be sure that the pack is fully discharged before recharging.
- Let a hot pack cool down before re-charging.
- Don't overcharge the pack or let it get hot.

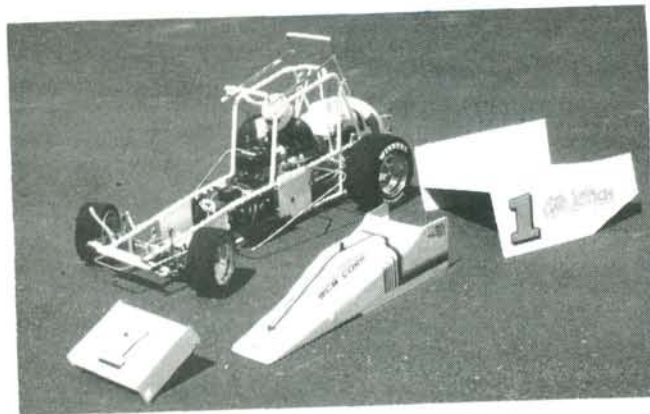
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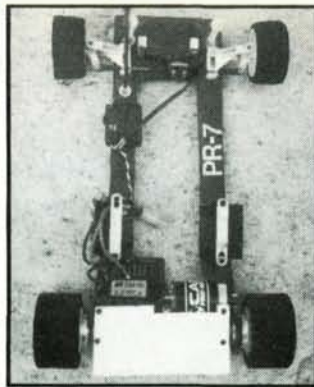
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3. Weight: open
4. Bodies: Grand National only
5. Batteries: R.O.A.R legal, no cell limit
6. Number of drivers: 1
7. Number of pit crew: two maximum
8. Decals: all cars must be NASCAR detailed

Look for more details in the April issue of RADIO CONTROL CAR ACTION.

For more information you may contact Lake Whippoorwill Speedway at 12345 Narcoossee Road, Orlando, Florida 32827 (305 277-9586).

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